LIGHTHOUSE

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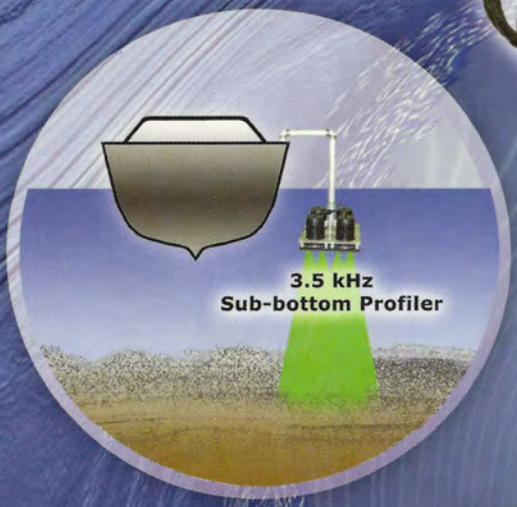
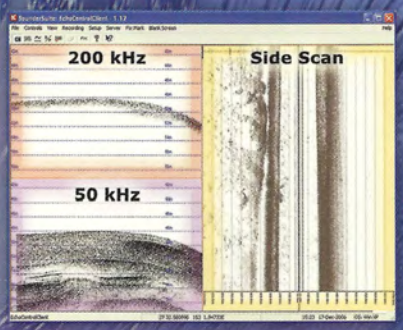
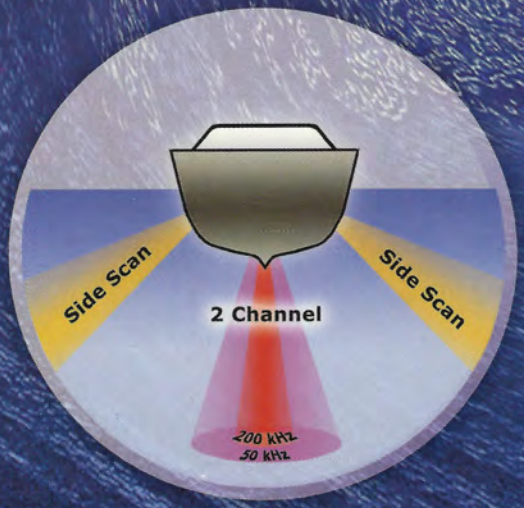


Two More Reasons To Be SINGLEbeam ....





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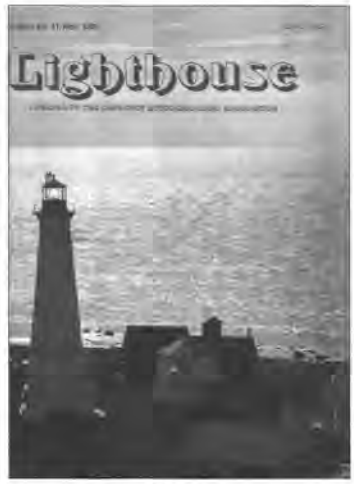
Cover / Couverture

Cape Sable Lighthouse

Cape Sable Lighthouse

The Cape Sable Island light is perched at the southern end of Cape Sable Island; at the extreme southern tip of Nova Scotia. The treacherous surroundings are attested to by a note on Chart 4241 that warns mariners that, due to potentially severe storms and changing shoreline, mariners ought not to come near without local knowledge. This light has appeared on the cover of Lighthouse before as evidenced by the May 1985 cover shown here. Note that the buildings are now gone and, in this issue's cover, the area plays host to a flock of sheep.



May 1985 Cover

List of Light # 327
Position: 43°23'24"N, 65°37'17"W
Chart #: 4210
Source: Coast Guard database

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Editor's Note / Note du rédacteur

The calendar has swung round, past the season of remembrance and into the season of joy. It has been a long time since our spring edition. Back then, we were looking ahead to CHC2008 and beyond that to the upcoming field season. The conference was worth the wait and I trust that the field seasons were equally successful. Now that has all come and gone.

We often think of time as linear; one thread attached to those before and after it. In truth, the phases overlap. That was readily apparent at the recent Remembrance Day service. There were large crowds assembled to remember and honour the service and sacrifice of the men and women who have served in the armed conflicts – past and present. It was remarkable how thin the ranks of the world war veterans have become; the fathers of our youth are all but gone. When I saw a grey haired veteran beckoning to the throngs of young cubs and girl guides to gather around the Cenotaph, I realized that the ceremony contained as many really young people as elderly and middle-aged.

This issue has similar traits. It contains a mix of the here and now, a look back at the past with an eye to the future and also a look ahead at some proposed enhancements to current publications. The latter example is provided by Steve Grant et al. They have done a fantastic job of laying out their conception of the work to be done to move CHS vertical datum to the International Hydrographic Organization (IHO) approved Lowest and Highest Astronomic Tide (LAT and HAT). Nick Stuifbergen has brought us an article that first appeared in Electronic Mariner on a new upgraded LORAN. As I grow older, I am delighted to see that the old ways are being adapted and refitted for new uses. Tom McCulloch's article on the early history of the CHA has from edition 55 has been reprinted. It is to be considered as the first part in a continuing story. John Klippen from Jeppesen gives us a look at how quality assurance permeates the lifecycle of ENCS. Captain Barry Lusk recaps the events surrounding the grounding of the *Queen Elizabeth 2*.

So it is an interesting mix of authors new and old, topics new and old. They look at how the events of the past have shaped our current days and how we may impact and prepare for the future. That is not all. The hugely successful CHC2008 is recapped by Brian Port. Equally, it is time to look ahead to USHC 2009 in Norfolk next May. Also, let us pay special mention to the sponsors and advertisers that have helped at both conferences and in this issue. As always, please keep the material, feedback and suggestions coming in. Have a safe and peaceful holiday season.

Craig Zeller

Message from the National President
Mot du Président national

How time flies! Is it that many months since we met in beautiful Victoria, British Columbia for our very successful Joint Conference (with the National Surveyors Association) CHC 2008 and our extremely well received Conference Edition of Lighthouse? Now fall is upon us as we look to our next edition of our Journal.

We welcome back several of our members who have been away on field survey and are now returning to their respective regions ready I hope to once again toil for the CHA. We note with interest, the increasing importance being placed on the Arctic by our Government. We urge all members to make a special effort to attend the AGM of their respective Branches and to "PARTICIPATE" – become involved in your Association – stand for elective office, write articles for Lighthouse etc.

Much has transpired over the past few months. The Canadian Institute of Geomatics (CIG) with whom we are affiliated, welcomed their new Executive Director Mr. David Stafford and are preparing for their AGM on November 20 during the Geomatics Atlantic Conference. We are still in the process of updating our Terms of Reference as the CIG's Hydrography committee, discussing a form of Certification of Hydrographers by CIG and concurred with their nomination for a Chair Elect of FIG Commission 4 – Hydrography. We are looking forward to participating fully on CIG's National Committee for FIG (CNC-FIG).

Congratulations to Mr. Jason Workman of the University of Calgary who was selected for our National Student Award for 2008. World Hydrography Day was once again celebrated by our members, invited members of the Hydrographic community and the public. The value of these events cannot be underestimated, as we seek to improve public awareness and raise our public profile.

In early September we accepted the kind invitation to attend and participate fully in the "Future of the Profession" working session and the 2008 Annual National Forum of the Canadian Surveyors' Associations, facilitated by the Canadian Council of Land Surveyors (CCLS). We look forward now to similar attendance and participation at US Hydro 2009.

In closing I would like to wish all our members and their families the very best as they prepare for the coming festive season.

Que le temps passe vite! Est-ce que ça fait déjà autant de mois depuis notre réunion à la belle Victoria en Colombie Britannique pour notre conférence CHC 2008, jointe avec l'Association National des Géomètres et si pleine de réussite et de notre édition de conférence de Lighthouse qui a été tellement bien reçu? Maintenant, l'automne est arrivé comme nous regardons vers notre prochaine édition de notre journal.

Nous souhaitons de nouveau la bienvenue à plusieurs de nos membres qui ont été partis dans les champs et qui sont maintenant en train de retourner à leurs régions respectives, prêts, j'espère, à travailler dûr de nouveau pour le CHA. (ACH) Nous remarquons, avec intérêt, l'importance croissante étant placée sur l'Arctique par notre gouvernement. Nous encourageons à tous les membres de faire un effort spéciale d'assister aux réunions AGM (AGA) de leurs départements respectifs et de "PARTICIPER" – mêlez-vous aux affaires de votre association – soyez candidat dans les élections, écrivez les articles pour Lighthouse, etc.

Beaucoup s'est passé au cours des derniers mois. L'Institut Canadien de Géomatiques (ICG) avec lequel nous nous sommes affiliés a souhaité la bienvenue à leur nouveau Directeur Exécutif, M. David Stafford, et ils se préparent pour leur AGM le 20 novembre pendant la Conférence Atlantique de Géomatiques. Nous sommes toujours en train de mettre à jour nos Termes de Référence en tant que le comité d'hydrographie pour le CIG, discutant une forme de certificationi pour les hydrographes par le CIG et en accord avec leur nomination d'un Chair Elu de la Commission 4 de FIG – Hydrographie. Nous nous en réjouissons à l'avance notre participation complète sur le comité CIG pour FIG (CNC-FIG).

Félicitations à M. Jason Workman de l'Université de Calgary qui a été choisi pour notre prix national d'étudiant pour 2008.

La journée mondiale d'hydrographie a encore été célébrée par nos membres, des invités de la communauté hydrographique et du public. La valeur de ces événements ne doit pas être sous-estimé, comme nous essayons d'améliorer la conscience publique et d'augmenter notre profil public.

Tôt dans le mois de septembre, nous avons accepté l'invitation gracieuse d'assister à et d'y participer complètement dans la session de travail "L'Avenir de la Profession" et aussi de participer au Forum National Annuel 2008 des Associations des Géomètres canadiens, facilités par le Conseil Canadien des Géomètres (CCG). Nous attendons maintenant avec grande impatience l'assistance et la participation similaires à US Hydro 2009.

En conclusion, j'aimerais souhaiter à tous nos membres et à toutes leurs familles le meilleur comme ils se préparent pour la période des fêtes.

George McFarlane

Loran-C To Become eLoran

By: Tim Queeney, Editor, Ocean Navigator

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The reliable, accurate and relatively low-cost Loran-C radionavigation system began a new lease on life in February 2008, when the Department of Homeland Security announced support for a new version of Loran called "eLoran"(enhanced Loran). This improved version of Loran can provide navigators with eight to twenty meter accuracy, and make it a great partner to GPS.

This positive news for Loran (the name comes from the term "long-range navigation") should put to rest the years of speculation about the future of Loran-C. Even though the federal government spent millions in the 1990's to upgrade the Loran system, and to build more stations to fill the mid-continental gap in coverage, there was speculation that perhaps Loran-C would no longer be needed in the age of GPS. In May 2000, when the Defense Department turned off "Selective Availability"(SA), it was a GPS world. SA is the name given to the program that denied full GPS accuracy to civilian users.

GPS products and applications were everywhere and Loran was looking a bit dowdy in comparison. Then in 2003 the European Union formally agreed to develop its own version of GPS, called Galileo. According to EU press releases, Galileo would put another 24 satellites in orbit, and would be interoperable with GPS, giving satellite navigation users 48 birds from which to get a fix. Given these developments, the US Coast Guard began to make noises about turning off Loran as a way to cut costs. Who would need a clunky old, land-based Loran when it seemed like we have a satellite future?

But as good as it is, relying solely on GPS has a drawback. What if GPS becomes unavailable? GPS users, in need of either an electronic navigation fix or precise timing data, are in trouble if they cannot receive a GPS signal. Some observers, most notably former FAA Administrator Langhorne Bond, raised the point that, rather than shut down Loran-C, perhaps the federal government should upgrade Loran-C - and make it more GPS-like.

Various ideas for improving Loran have been developed over the years by the Coast Guard Research and Development Center, and by the Department of Transportation. Some of these ideas came together in the eLoran system. The result is improved absolute position accuracy for navigation, better fix reliability, and precise timing for tasks like switching cell phone networks. "For both timing users and navigation users, there is a higher level of integrity using eLoran" said Zachariah Conover, president of CrossRate Technology, an eLoran/GPS receiver company in Standish, Maine, USA.

There are three main aspects of eLoran that make it different from the way Loran-C is operated at present:

1. the timing control of the broadcasts,
2. the addition of corrections embedded in the signal,
3. a different scheme for monitoring and control of the signals.

The Loran-C we relied on in the 1980's and early 1990's, before GPS took over, was a system designed around chains, each chain synchronized separately (e.g. the 9960 US Northeast chain, the 9940 West Coast chain). This Loran system went into operation in 1965 and was dubbed Loran-C by the US Coast Guard (Loran-A was an earlier system, operating at a higher frequency at shorter ranges; Loran-B was an experimental system that was never deployed). In the chain setup, a master station broadcasts a sequence of pulses and the other stations in the chain, called secondary stations, then in turn broadcast their pulses in a set sequence. The time required for the entire chain to broadcast their pulses, is called the Group Repetition Interval (GRI), measured in micro-seconds. The master station has a cesium atomic clock that allows it to precisely control the times of its transmissions. The secondary stations take their cue from the master broadcasting their pulses in their pre-defined sequence called the coding delay. Chain control is governed by System Area Monitors (SAMs), that track the signals of a

chain and provide slight corrections to compensate for seasonal effects. The user's receiver tracks the GRI of a chain, and then uses the signals from each of the stations in the chain to find a position fix.

However, eLoran uses a different approach for determining when a station transmits its signal. "With eLoran you go from SAM control to Time of Transmission control", said Conover. Each station has its own cesium atomic clock onsite (all Loran stations have had cesium atomic clocks since about 2002), and using these clocks; each station broadcasts its pulses based on Universal Coordinated Time (UTC), rather than using the GRI coding delay and the fine timing adjustments ordered by the SAMs.

The result is a "chainless" system, without masters or secondaries. In this arrangement the eLoran receiver can use the signals from any station within receiving range i.e. it is an "all-in-view" receiver. This greatly increases the number of stations available for position finding. Instead of using only three transmitters of a chain (master and two secondaries), an eLoran receiver might have as many as 10 stations it can use.in combination. The timing change is currently being tested by the Coast Guard Loran Support Unit (LSU). "The Time of Transmission (TOT) concept is undergoing testing right now on the 9960 Northeast chain and the 8970 Great Lakes chain", said Cmdr Christopher Nichols, commanding officer of the LSU.

Another major improvement in eLoran is a change in the signal structure of the secondary stations. In the earlier Loran-C setup, secondary stations broadcast a sequence of eight pulses when it is their turn to transmit. Now however, all eLoran stations will send nine pulses each time they broadcast (master stations have always had a ninth pulse, but it was used then for another purpose, i.e to distinguish master from the secondaries) Older non-eLoran receivers will still be able to operate and get a fix from the new system. Essentially, they will not see the ninth pulse.

This new ninth pulse will transmit useful data bits to eLoran receivers, including signal corrections, timing data and an error-correction component. This message will be 120 bits in length with five bits sent each GRI. Thus the entire message is sent 24 x GRI, and the maximum time required to send the entire 120-bit message would be approximately 2.4 seconds. So roughly every 2.4 seconds you have new signal-correction data, that allows your eLoran receiver to correct for signal errors. This is similar to the differential approach used in FAA's Wide Area Augmentation Service (WAAS) for the GPS-correction scheme used by most current GPS receivers to improve accuracy. These signal corrections are what enables eLoran accuracy to get down to the eight to twenty meters required for harbour navigation.

The third element needed for eLoran is improved signal monitoring, which means having additional monitor station sites installed. "The current SAMs could be used" said Nichols. "But they are too few to cover all of the areas needed in an eLoran system, both for harbour approach and for general aviation." The real benefits of eLoran come from a combined GPS/eLoran unit that can obtain a fix using either system. With a combined receiver, users will have the "belt and suspenders" facility of a mutual back-up system, in case either system becomes unavailable. CrossRate Technology has developed a combined eLoran/GPS receiver called the model "eLGPS1110".

About The Author...

Tim Queeney is the editor of Ocean Navigator, a magazine covering marine navigation and ocean voyaging.

Article submitted by Nick Stuifbergen, CHS Atlantic Region

The Grounding Of The Queen Elizabeth 2

By: Captain Barry M. Lusk, CLS, Mht.

Queen Elizabeth 2: Built in 1969.

The famous Cunard cruise liner *Queen Elizabeth 2* (commonly known as *QE 2*) grounded at 21:58 hours on August 7, 1992, 2.2 nautical miles south-south west of the light on Cuttyhunk Island. Her position was described as 41 degrees, 22.1 minutes North and 70 degrees 57.7 minutes West by the officer on the bridge at the time. This area of the grounding lies off the coast of Martha's Vineyard and the state of Rhode Island in the United States of America.

The *QE 2* had spent the day anchored in the shallow passage just north of Vineyard Haven on the Island of Martha's Vineyard (Figure 1). The ship's crew had taken a large number of the cruise passengers ashore during the afternoon for a land excursion. They were all due back and aboard the ship by 18:00 that afternoon as the ship had to be in New York harbour that evening. This was the termination of a 5-day cruise to Halifax, Canada. The passengers were late getting back aboard and the ship weighed anchor quickly, trying to make up for this lost time. Due to the shallowness of the passage, the ship navigated slowly down through the channel to the north and east of Vineyard Sound. The pilot aboard set a course of 240 degrees to take the ship clear of the Torpedo Range in Rhode Island Sound and Block Island. He also, once clear of the dangers and with the Captain's permission, increased her speed to over 20 knots in an effort to reach New York Harbour as scheduled. At 21:58 the ship ran aground on an uncharted shoal in the geographic position noted above.

Figure 1: General grounding area off the East Coast of the United States.

The uncharted shoal is the story here and one with very serious ramification for all Hydrographic Offices (HO) throughout the world. SOLAS, the United Nations Convention of Safety of Life at Sea, requires signatory countries to provide modern and safe nautical charts to ensure maritime safety and requires these countries to see that old surveys meet modern standards and that modern surveys follow old and well-established procedures. The procedures for determining least depth over indicated shoals has not changed because surveyors now have multi beam and swath sounding capabilities.

The then United States Coast and Geodetic Survey (USGC established 1807), the predecessor to the now National Oceanic and Atmospheric Administration (NOAA established in 1970), surveyed this area in 1939. The ship *Lydonia's* surveyors, under the command of Raymond P. Eyman, produced a smooth sheet (a smooth sheet is a hard copy record of the information gathered during the survey) at a scale of 1:40,000 which is 1.82 inches to the nautical mile. The primary sounding lines were spaced 1500 feet or ¼ nautical mile apart over the area of interest. The area in question and a copy of a small portion of the smooth sheet is inserted here so that the reader may clearly see the shoaling area (Figure 2).

All qualified hydrographers and others will immediately see that the six mainline sounding lines very clearly indicate a shoaling area. In the case of appreciable shoaling such as this there are certain rules and regulations on how this information must be addressed. Below, I will paraphrase the standards and requirements contained in the 1931 USCG Hydrographic Manual and the 1936 and 1938 instructions written for this survey. The Hydrographic manual and the survey instructions are mandatory.

Development should have included, for example, decreasing the spacing of the sounding lines run by the survey vessel *Lydonia* in 1939. The 39-foot shoal in question was found on one of the 1939 main sounding lines. It was a shoaler sounding that lay between two soundings. The soundings are a 52 feet, to the south, and 50 feet, to the north. These two soundings, the 52 and 50 would normally be plotted, as they were and the shoal sounding of 39 squeezed between them. It would have been called a "tweener" in Canada and is plotted half way between the two normal soundings. The importance of this observation is that this shoal was recognized as a shoal at the time and was considered an important deviation from the norm, as were the indications of related shoaling on the other six 6 lines. Additional fieldwork should

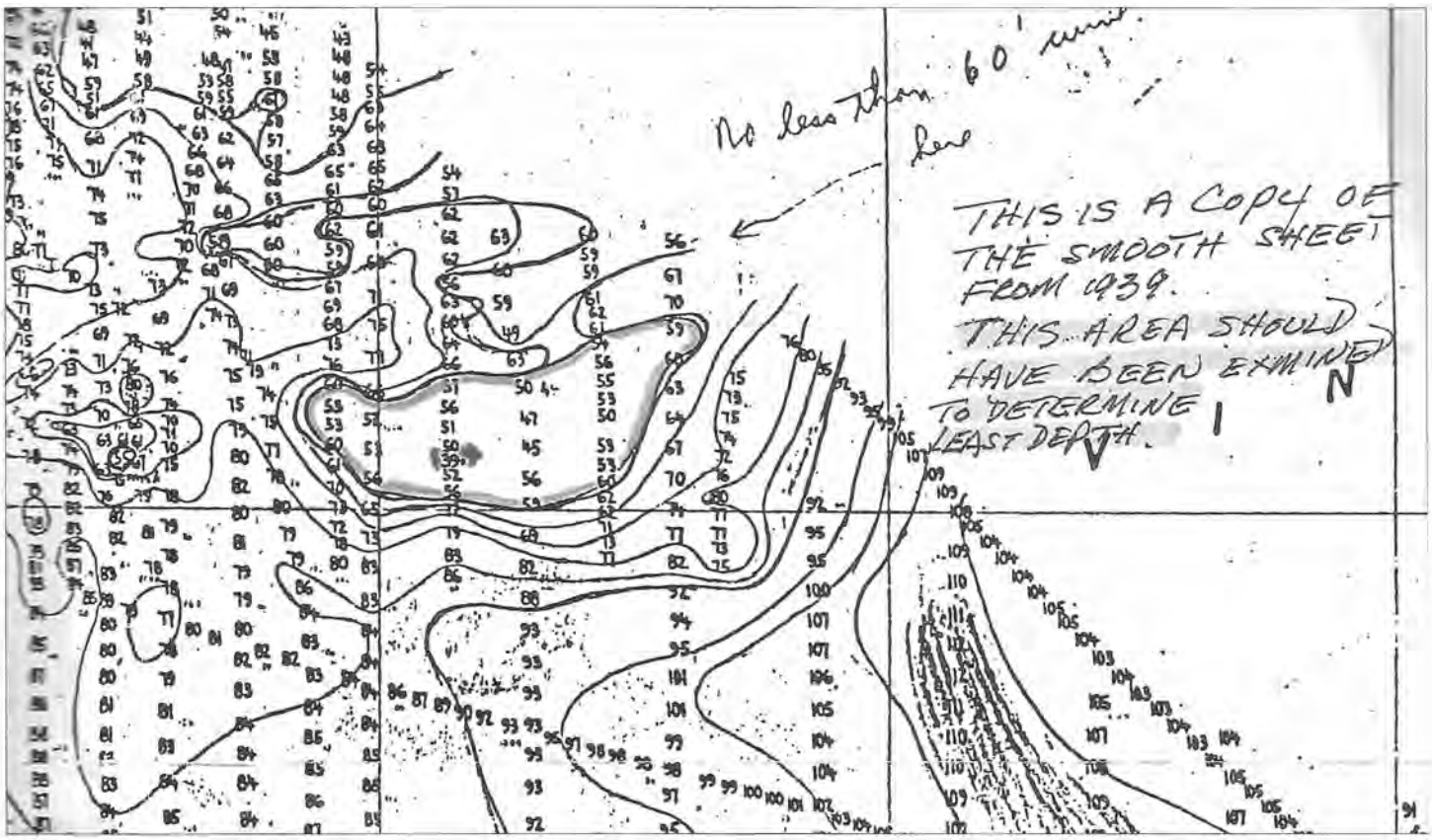

Figure 2: The area enclosed by the light gray line and the six main sounding lines that define the shoal is the area under discussion in this article. The centre darker gray dot is a 39 foot sounding that the surveyors inserted between the two called for soundings. The squeezing in of this extra sounding indicates an important realization of the critical nature of this shallow depth by the surveyors aboard the "Lydonia".

have included a series of closely spaced sounding lines to fully develop this area and should have been carried out at the time. Further leadline verification for depth and bottom characteristics would be required according to the USCG Hydrographic Manual in force at the time. Further information may have been gathered using a wire drag as was suggested for other areas on the sheet by the officer in charge, Raymond P. Eyman, in his season's report.

The USGS Hydrographic Manual of 1931 reads; "this manual is issued for the purpose of giving the general requirements of the United States Coast and Geodetic Survey for the execution of hydrographic surveys and to describe the equipment and methods used for hydrographic work." The instructions continue: "such indications (of shoaling, my words) should be emphasized on the boat sheet as soon as noted, by ringing with a red pencil or other means, and a careful and complete examination to develop the bottom thoroughly and to determine the least depth shall (my emphasis) be made, regardless of any prearranged system of lines." The instructions continue with: "the primary duty of the hydrographer is not the mechanical operation of running sounding lines but is properly to develop the area being surveyed. For the development of shoal indications..... the methods generally used for surveys should be modified as may be necessary to secure a complete and economical development of the feature under examination." Under the general title Development of shoals the manual states: "development of all shoal indications is one of the most essential details of hydrographic work. In order that all sounding indicating possible shoals may be noted..... Shoals should be developed by a closely spaced system of cross lines to determine the high points, which may be examined further by drifting over them and feeling them out with a lead."

The standards and requirements which the government failed to observe included the failure to develop the 39 foot sounding discovered on September 7, 1939 or at anytime thereafter and the failure to carry out additional field work in the area of the 39 foot sounding though recommendations to do so were made by Division of Charts and specified within the manual as mandatory.

It is my opinion, and very much supported by the facts, the forgoing deficiencies in the hydrographic practices of the Government in this case caused the grounding of the *QE 2* in Vineyard Sound on August 7, 1992. Subsequent hydrography was carried out over the following years in this area and on this smooth sheet to correct and add additional information, but this shoal area was never looked at until the NOAA ship *Rude*, under the command of Lt. Commander Perugini, determined in 1992 and a few days after the grounding (investigations began on August 10, 1992 and continued for two weeks) that the area around the 39 foot shoal found in 1939 was in actual fact a 30 foot shoal and it and other shoals in the area showed signs of being struck by the hull of the *QE 2*.

It is hoped that current HOs' no longer carry out surveys to accommodate specific size ships but carry out surveys to show a complete description of water depths, shoals and earth shapes. This is as it should be and with a modern sweep system, 100% bottom coverage is possible. However, shoals will still require closer examination to determine least depth.

So why would I risk embarrassing the U.S. hydrographic office? The answer to this is to draw attention to the importance of thoroughness of investigations to determine potential dangers and not use excuses such as lack of resources or time to placate shoddy workmanship and poor attention to establish practices. NOAA had an opportunity to further investigate and determine least depth on this shoal in 1939, in 1949, in 1959, in 1969, in 1979 and in 1989 but it took a $20million dollar grounding of the *Queen Elizabeth 2*, in 1992, to complete the task and determine that in the immediate area of a 39 foot shoal there was an uncharted 30 foot shoal. If known the *QE 2*'s pilot would have avoided this area knowing, that they were drawing in excess of 32 feet of water at that time.

Cunard brought a civil action case for damages against the Government of the United States of America for $50 million. A trial was held in the New York State District Court in November 1997[1]. [4]

[1]This case came before a judge in this New York court in November 1997. The court exonerated the US Government of any culpability in regards to this grounding and the uncharted shoal. Do the facts support this decision?

About the Author...

Barry M. Lusk was employed by the Canadian Hydrographic Service from May 1960 until his retirement as Hydrographer In Charge in 1994. In 1995 he set up his own consulting firm , "Lusk Hydrographic Expertise". His web site at *www.hydrographicexpertise.com* and it is suggested that interested parties may access the site to determine this companies primary focus.

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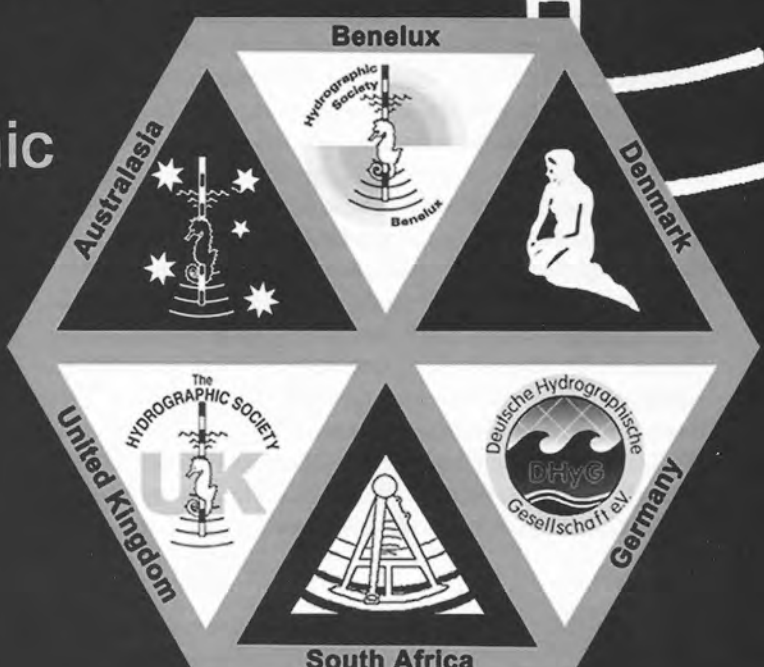

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Highest Quality Throughout All ENC Product Stages

Ensuring Highest Possible Quality From Chart To Exchange Sets

By: John K. Klippen, Product Manager, Jeppesen Marine, Norway

Introduction

The term ENC Quality Control and Assurance is not limited to the production process for individual chart cells, but must be considered throughout the entire ENC life cycle (Figure 1).

The life cycle for an ENC includes source data assessment and verification, product compilation, validation and publication followed by continuous product maintenance and finally termination. This is a complex procedure where quality processes must be integrated.

The issuing Authorities' responsibility is further extended to also include the distribution aspect, as a minimum limited to the data collection quality.

Quality Control cannot be limited to verifying S-57 encoding with successful testing stipulated by IHO S-58. A cartographer knows that there is a variety of scenarios that cannot be detected by automatic testing, this is related to the quality of the source data, digitizing and product collection within IHO S-57 Exchange sets.

Figure 1: ENC Life Cycle

1. ENC Planning

- **Coverage model** (Paper chart equivalent or Cell grid based)
- **Usage (Scale) band** (Small-/large scale coverage; priorities)
- **Available sources** (existing products, surveys, fair sheets, survey sheets etc)
- **Bi-lateral agreements** (covering national border areas)

ENC Planning is defined by "the establishment of a seamless and adequate ENC coverage within given usage bands, and assurance of source data quality required to enable safe navigation".

To allow an effective quality management for the planning process, the producer should have effective tools and technologies at hand enabling access to all required source data (and its meta data) and have them visualized for easy comparison (Figure 2). The meta data must hold enough information so that qualified decisions can be made.

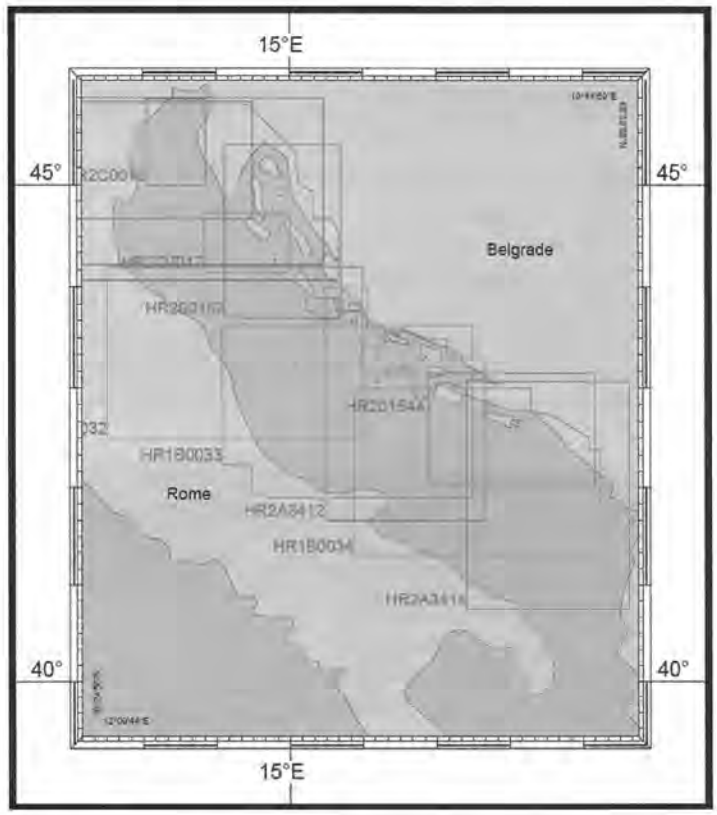


Figure 2: Source and Coverage Overview

2. Source data assessment

- **Source data retrieval**
- **Normalizing/Transformation** (raster sources)
- **Processing survey data** (product preparation for source survey data)
- **Other Available sources** (List of lights, old repromats)
- **Databases** (other available sources Land data, international available data, etc)

The source data assessment involves not only collection of available and required source data for the ENC product(s) but must ensure highest possible quality for the chart coverage.

The producer needs tools and technologies to assess and fine tune the sources to meet (at least) the minimum requirement for ENC production. Here implicit (not limited to) product dependant data cleaning/collection, normalization and transformation of analogue sources where the quality aspect for the normalization is vital.

3. ENC Production

•Meta data (Accessibility to required meta data)
•Positional accuracy (Positional accuracy must be accessible and of high enough quality)
•Digitizing/S57 Encoding (integrated quality control means avoiding/limiting human errors)
•Import (imports should be directly to S57 format, enabling on-the-fly object and attribute creation and consequently quality control)
•S58 Validation (automatic testing routines towards IHO S58 checks)
•Coverage accuracy (Visual means must be available to handle edge matching, coverage consistency etc.)

A production tool should be consistent with respect to data formats, input and output, to ensure and enable a highest possible quality throughout the production. Limiting the number of conversions to/from data formats will improve the quality of data and consequently, the need for special attention by the operator with respect to quality control.

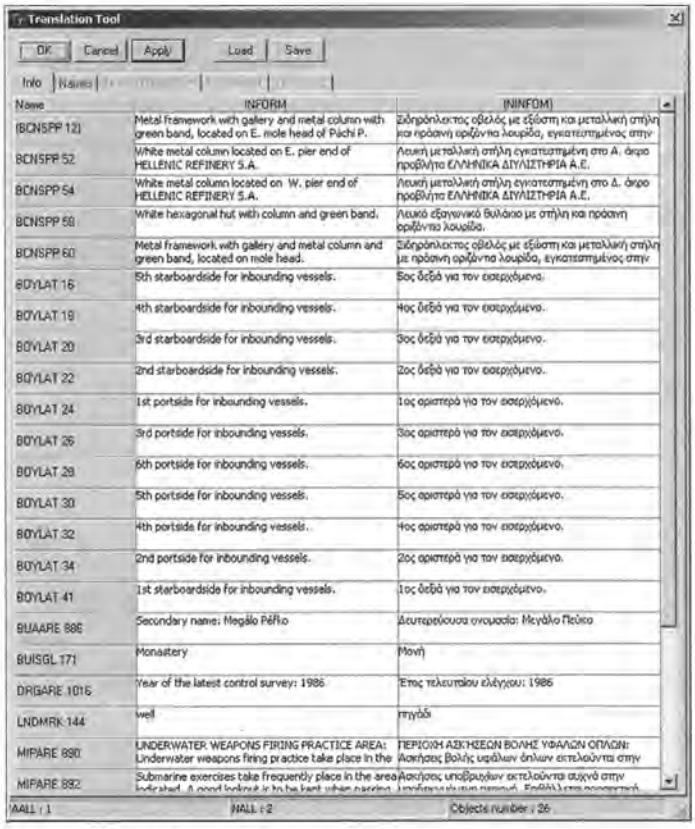


Figure 3: Text Translation and QC Tool

Jeppesen has always focused on this matter; the internal format used is based on standard IHO S-57. Therefore, any data imported into the production environment is "directly", with assistance of controlled import routines, converted to S-57 (Figure 3). The users can then validate the imported data on-the-fly allowing resources to be allocated with other more important processes within a production stream.

With the IHO S-58 standard, the producer has been provided with a common platform for testing and validating the ENC's and its S-57 encoding. This further improves the quality of the end product.

Even though the S-58 standard provides effective means to test and ensure the quality of an ENC, there are still a variety of important elements, which are not covered by the standard. For example, the correct presence and location for the objects, their attribute values, positional accuracy etc.

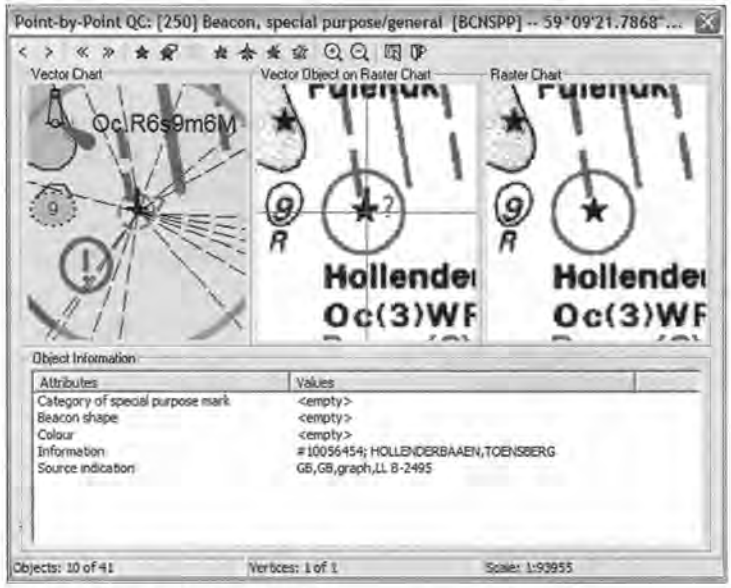


Figure 4: Point-by-Point QC

An effective production must be able to provide secure and effective means to also quality assure these items.

Point-by-point QC allows the user to validate the encoding and correct positioning of all the objects from an analogue source (Figure 4). The user is guided through either all object, or just the queried ones. Visualization gives position, object and attribute values and last but not least each checked object is "flagged" as being checked.

Window-by-Window QC (Figure 5) allows the user to be guided through the entire coverage area and visual control on object digitizing and encoding is preformed.

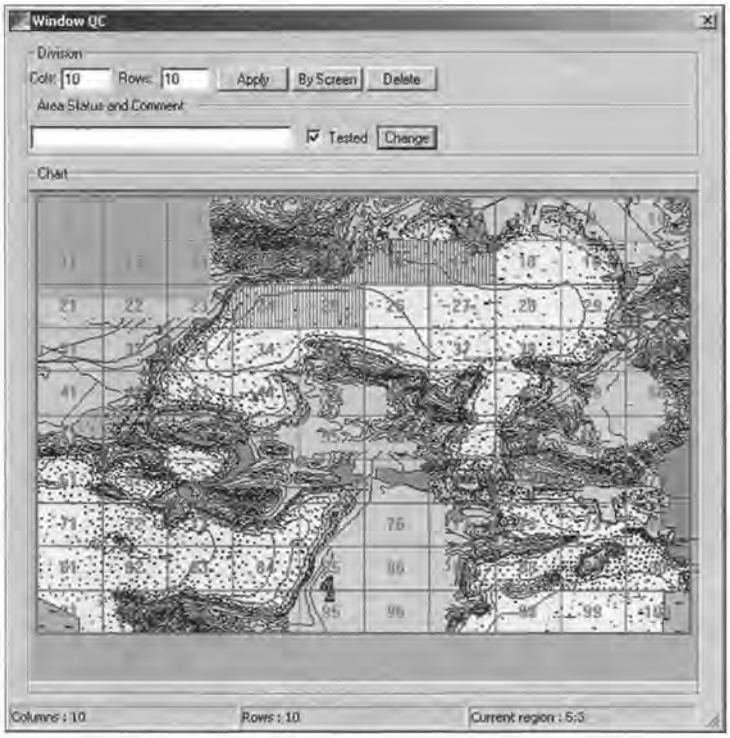


Figure 5: Window-by Window QC

4. Publication and Distribution

- **Final quality control** (Full testing, manual and automatic, is required before an ENC is finalized)
- **ENC Stamping** (Upon completion of all QC/QA routines the ENC file is "stamped" so that any further changes made, will automatically create S57 update files (ER files))
- **Exchange set creation** (S57 defines exchange set parameters for release of an ENC file as a set of files, named S57 Exchange Set. This is a collection of ENC(s) and referenced and required files)
- **S63 Encryption** (depending on policy, the ENC Exchange Set may be encrypted to avoid piracy and illegal copying of the data)
- **Distribution** (depending on policy, distribution of ENC's may be made through International ENC centers or private industry, or a combination of both)

When the production of a S-57 cell is declared completed and approved, the "approval" of the cell will result in a "Published" ENC. Any changes made to/on an approved ENC will automatically create a update file.

Encryption is in practical sense a direct change of the data itself and quality assurance must therefore be performed also on the encrypted data set. Validation and quality assurance in this respect implies the ability to de-encrypt the exchange set, perform consistency checks and subsequent approval of the data set.

The complexity of IHO S63 is rather high, but nevertheless the user/producer must be able to perform such validation to further ensure safe navigation for mariners. In most of the cases this validation resides within a RENC organization, but even for "internally" released ENC's such testing must be conducted.

5. ENC Update and Maintenance

- **Source assessment** (There is a high requirement to the quality for sources used for updating ENC's, both positional and product relevant)
- **ENC Update production** (ENC Update creation should be handled/covered by standard production routines)
- **ENC Re-issue** (The amount of updates defines that an ENC should be re-issued. Meaning that all update files are combined within the ENC EN-file)
- **ENC Update validation** (ENC Updates do undertake the same level of quality control as for the main ENC file, and update files must therefore be tested individually and as an integrated part of the main ENC file)
- **ENC Update distribution** (Distribution of ENC Updates undertake the same quality control requirements as for ENC distribution)

An ENC not covered by a maintenance program, cannot be classified as an ENC. This is not defined by when an update is actually available for the chart, but by when an ENC was "Last checked" for updates.

To raise the quality of the maintenance process the source messages (e.g. Notice to Mariners) are fully integrated within the production line (Figure 6). This means that source messages for NtM's or general corrections are used for the update task and its quality control.

6. ENC Termination

- **New Edition** (amount of or nature of corrections/maintenance defines the ENC to be issued as a new edition.
- **Termination** (The ENC product is defined as obsolete, which results in an "termination" update file, and no further updates may be done on the ENC)

When an ENC is defined as obsolete, for several reasons; new coverage/products available, obsolete products e.g., the operator must be able to validate and quality assure the decision for the termination process. In the same context, the "Termination" process must be accessible only when defined criteria's are fulfilled and the cancellation update must be created automatically (and distributed through standard distribution means).

From a quality control perspective, a termination must result in a "locked" dataset, where no further corrections/ changes can be applied.

Quality Management

Electronic navigational chart as a product is more demanding from a quality point of view than its paper predecessor. First of all because it is used with a very accurate and sophisticated instrument such as ECDIS. Deficiency in data quality may compromise the very idea of computer-aided navigation.

As we have seen from practical life, the ISO-9000 certificate is not always a guarantee for the final EN and ER products' quality (mainly because the matter of certification is not the cartographic technology but the administrative procedure which supports production). Obviously, to

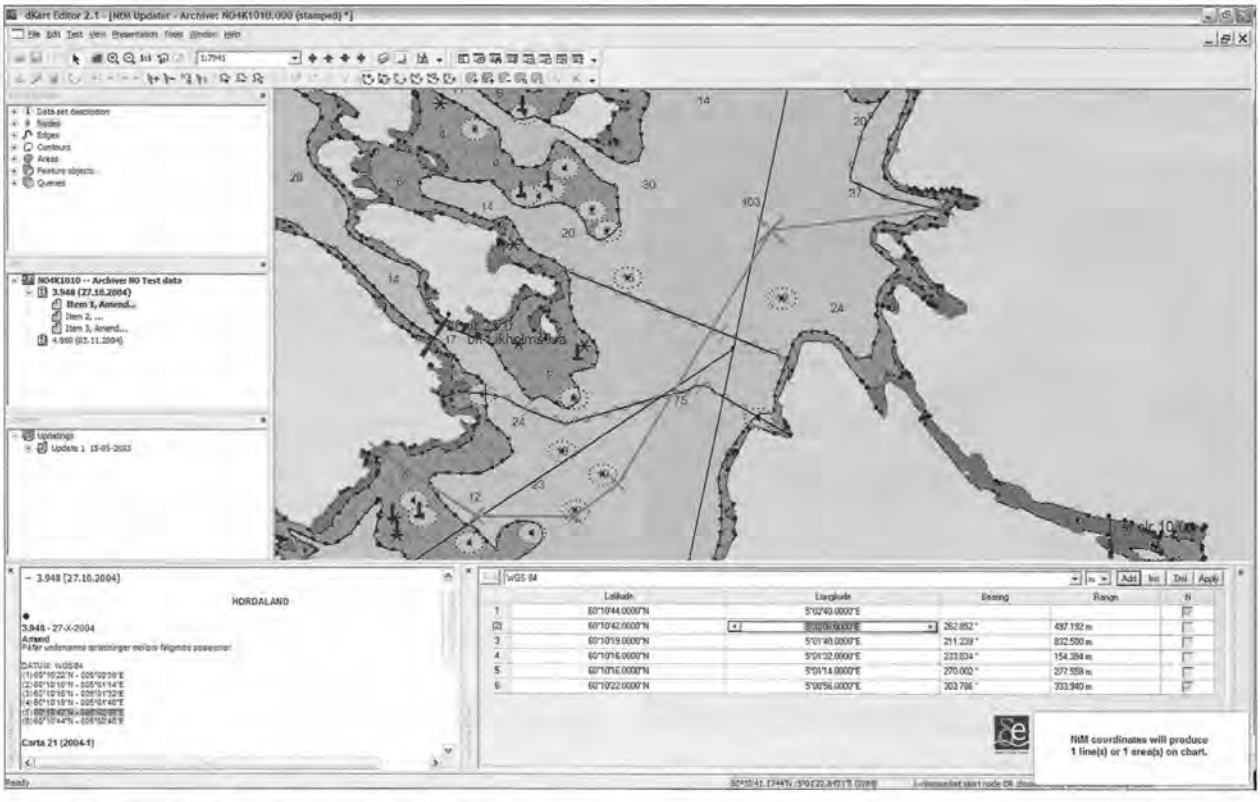


Figure 6: Integrated NtM Based ENC Updating

meet the ENC challenge a quality management system must be technically integrated with the production system at each stage of chart production and maintenance. This has been well understood by many data producers and we can observe an intensive development in this area.

Conclusion

Quality of an ENC is a complex matter. As we have seen, the task of ensuring ENC quality during practical chart production is much wider than a direct implementation of S-57 and S-58 requirements. Specific tools at each production step must be employed in accordance with error-proof technology and the whole process must be controlled via an established quality management system. This is the most practical approach to providing the mariners with reliable ENCs of really high quality.

About the Author....

John K Klippen has been working for the C-MAP group since 1994, since 1998 for HydroService AS (a C-MAP Norway subsidiary company). He has been manager for several integration and implementation projects/contracts with several hydrographic offices around the world (e.g. UKHO-United Kingdom, NHS-Norway, HHI-Croatia, HNHS-Greece etc). He now holds the position as Product Manager for dKart products as part of Jeppesen Marine, Maritime Industry.

Proposed New LAT/HAT Tide Tables For The CHS

By: Steve Grant, Electronic Navigation Consulting International, Darmouth, NS
Dave DeWolfe, Discovery Consultants Limited, Chester Basin, NS
Grant MacLeod, True Course Consulting, Dartmouth, NS
Dale Nicholson, Central & Arctic Region, Canadian Hydrographic Service, Burlington, ON

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows, and in miseries.
On such a full sea are we now afloat;
And we must take the current when it serves,
Or lose our ventures.

Brutus, Julius Caesar Act IV Scene 3: Within the Tent of Brutus

In this paper we summarize the results of several years of studies into the challenges facing the Canadian Hydrographic Service (CHS) in its migration toward the new International Hydrographic Organization (IHO) LAT/HAT Chart Datum standard. We look at the IHO technical resolution and analyze it in the CHS context. We then look at the status of the CHS tide station data and assess the magnitude of the task at hand. We present a scenario that allows the CHS to convert the tide tables to the new datum separately from the charts and other documents. As part of this process we present a new design for the tide tables; this is necessary since the existing design is incompatible with the new IHO Chart Datum.

Definition of LAT and HAT:
HAT (Highest Astronomical Tide), *LAT* (Lowest Astronomical Tide). The highest and lowest levels respectively which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. These levels will not be reached every year. HAT and LAT are not the extreme levels which can be reached; storm surges may cause considerably higher and lower levels to occur.

Background and Early Results

In the late 1990's the CHS, as a member of IHO, agreed that it was desirable to migrate to Lowest and Highest Astronomical Tides from Lower Low Water Large Tides and Higher High Water Large Tides (LLWLT & HHWLT) as the vertical datum references for the CHS. The decision to standardize vertical hydrographic datums internationally was made by the IHO at the XVIth Conference in June 2002. At the national meeting in June 2004 the CHS Directors agreed in principle to adopt LAT/HAT.

The IHO LAT/HAT Technical Resolution (TR) is found in Appendix 1 along with a discussion of how it might impact the CHS.

In 2005/06, a study was undertaken to determine how the move to LAT/HAT would affect CHS products and operations and to ensure that the costs would be acceptable. The first task was to analyze the resolution and communicate the details (discussed in Appendix 1) to CHS staff and stakeholders. This was done via face-to-face meetings and a questionnaire. The study also included an assessment of the whole range of CHS products, databases and services, especially paper and electronic charts, to determine the magnitude of the problem and get a sense of the mechanism, time frame and cost of undertaking this migration. An implementation plan was also outlined. A number of important findings were made, not the least of which were that the CHS cannot address a massive recompilation of its charts and that each of the regions of the CHS face different challenges.

An analysis of the approximately 800 large scale (> 1:100,000) CHS charts by the Atlantic Regional Tidal Officer (personal communication) found that the Chart Datums of all but 72 charts were within 0.3 metres of LAT. As discussed in Appendix 1, the accepted practice in Canada and elsewhere is to adjust the level of Chart Datum (CD) when the difference between CD and the target level, i.e. LAT, is 0.3m or larger. This means that over 90% of these charts already appear to be compliant with the IHO TR. No analysis of HAT has been made to this point, however, to make these charts fully compliant for LAT, only the terminology in the titles and tidal information blocks needs to be changed. The charts don't need to be recompiled as many thought might be the case at the start of the study.

A number of benefits of this migration were identified:

a. CHS personnel will better understand the meaning and origins of Chart Datum because of the simplicity of the description of LAT & HAT.
b. It will put the CHS on a better legal footing because:
    i. It is an international standard, and
    ii. It is easier to describe to the courts.
c. Since it is an international standard that has been in use for many years in some countries, the CHS will benefit from the existing and growing body of knowledge of LAT and HAT.
d. Mariners trained in Canada will understand Tidal Datums in other countries and visa versa.

The conclusions and recommendations from that first report were:

1. The research and development [into a new Tide Tables design] should be undertaken as soon as possible.
2. The CHS should adopt LAT as its new Target CD.
3. The CHS should adopt HAT as its new Target datum for elevations and clearances.
4. The CHS should define a new term for its Target datum for elevations. e.g. Elevations Datum (ED) and if the ED is established in a different year from CD there should be an entry in the appropriate CHS document as follows: Elevations Datum (YEAR).
5. The CHS should retain all the old 'Large Tides' and 'Mean Tides' terminology with two exceptions: replace LLWLT with LAT and replace HHWLT with HAT.
6. The CHS should replace the expression 'Lowest Normal tides' in all CHS documents with 'Chart Datum (YEAR) where YEAR refers to the year the particular Chart Datum was established.
7. The CHS should use the 'vector-averaged' constituents for all the LAT/HAT computations.
8. The CHS should expedite the work mentioned in a response to the questionnaire concerning the derivation of the vector averaged LAT/HAT values for the short-term Secondary Port records.

The recommendations from this work were accepted by the CHS Senior Management Committee and in September of 2006 they directed the Project Leader to implement the next steps in this process: (a) the production and testing of a new tidal constituent vector averaging software package, the processing of a number of tidal constituent records and documentation of the results and (b) a redesign of the CHS Tide and Current Tables, the documentation of the required changes to CHS Charts as a result, and the development of a methodology to implement the changes. This work is the subject of the remainder of this paper.

The Development and Testing of the Vector Averaging Software Package

The necessary methodology to compute vector averaged tidal constituents had been developed and tested by CHS. However, it existed as an experimental MICROSOFT EXCEL© Spreadsheet. A stand-alone MICROSOFT WINDOWS© menu driven vector-averaging program was written and tested as a part of a production oriented package. It can read and write standard tidal constituent files, and do error checking and reporting.

A companion program was developed to compute the levels of HAT, LAT, MHHW, MLHW, MWL, MHLW and MLLW from 19 years of predictions, which can be generated from any constituent file including a vector-averaged one. As well, the range ratio (secondary port / reference port), and the mean and large tide ranges are computed and an Elevation Datum (ED) correction (discussed later) is calculated.

Ten percent of the thousand or so Canadian tidal stations (i.e. one area from each of the seven volumes of the Canadian Tide Tables) were processed using this software during this project. The data in Figures 4 and 5 are a sample. Initially it was assumed that all the annual analyses results existed in the Marine Environmental Data Services (MEDS) database but that turned out not to be the case. So, before the vector averaging could be done it was necessary to obtain all the hourly height data available over the past few decades and perform tidal analyses, with all the problems that that entails, on each year of data. To ensure a reliable result, annual analyses with less than 92% (1 month) of data were not used in the vector averaging calculations.

There were a number of occasions where errors were discovered in both the 'official' tidal constituent set and analyses; these were usually caused by the omission of inference. All constituent sets for secondary stations need to be checked to see if they include inferred constituents. If not, they should be re-analyzed to include at least the standard inference. This experience serves to show that this is not a 'turn the crank' process; the work must be accompanied by rigorous quality control to weed out errors in the 'official' data sets.

The Proposed Redesign of Canadian Tide and Current Tables

Why do the Canadian Tide and Current Tables need to be changed to accommodate LAT/HAT?

This is a good question and, fortunately, easy to answer. You can't just 'plug' LAT and HAT into the existing method

for predicting secondary port tides. The existing method uses time and height differences to correct the reference port times and heights to obtain the corresponding times and heights for the secondary port. The method for calculating these corrections was derived decades ago using empirical equations that few people understand today. It would be a tedious task to repeat that work for LAT and HAT. A far simpler approach, the one that was taken here, was to look at what other Hydrographic Offices around the world are doing and adapt their approaches to the Canadian situation.

The main sources for the secondary port prediction procedures described below are the Canadian Tidal Manual and the tide tables of the United States, Great Britain and Australia. The common feature all these sources share is the Range Ratio Assumption described in the next section.

Technical Basis for the New Tide Tables Design

The Canadian Tidal Manual describes a method for establishing a new sounding datum at the beginning of a hydrographic survey by water level transfer from a nearby location with an established chart or sounding datum. It involves simultaniously measuring the tidal ranges at the two sites and using the ratio of these ranges to locate the new sounding datum. The range ratio is also used extensively in the tide tables of the three countries mentioned above. They are all based on the Range Ratio Assumption (RRA). Before describing the RRA, a few of the tidal water levels that are used in this paper and internationally are defined.

MHHW (Mean Higher High Water). The mean of the higher of the two daily high waters over a long period of time. When only one high water occurs on a day this is taken as the higher high water.

MLHW (Mean Lower High Water). The mean of the lower of the two daily high waters over a long period of time.

MWL (Mean Water Level). MWL is the average level of the sea surface over a long period, preferably 18.6 years or more, or the average level which would exist in the absence of tides.

MHLW (Mean Higher Low Water). The mean of the higher of the two daily low waters over a long period of time.

MLLW (Mean Lower Low Water). The mean of the lower of the two daily low waters over a long period of time. When only one low water occurs on a day this is taken as the lower low water.

Range Ratio Assumption

The RRA describes a relationship that often exists between the tides at two ports. That is, the tidal range at one port is related to the tidal range at the second port in a constant ratio 'a'. It is illustrated in Figure 1 where the ranges at the Secondary Port are 80% those at the Reference Port or

$$a = \frac{r}{R} = 0.8 \qquad (1)$$

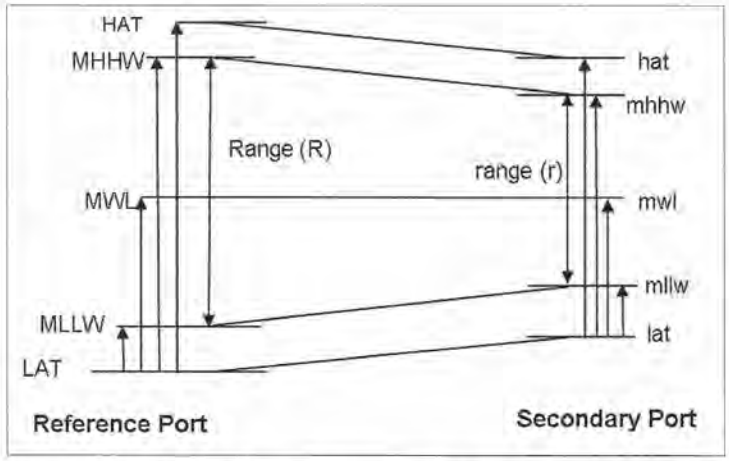


Figure 1: The Range Ratio Assumption describes a relationship that often exists between the tides at two ports where the tidal range at one port is related to the tidal range at the second port in a constant ratio.

Under the RRA, all the other height differences at the two ports also have the same ratio. That is, measuring the tidal height from 'LAT' at the Reference Port and from 'lat' at the Secondary Port:

$$a = \frac{mwl}{MWL} = \frac{mhhw}{MHHW} = \text{etc.} \qquad (2)$$

Under these conditions predicting tides at the Secondary Port is easily accomplished by simply multiplying the tides at the Reference Port by 'a'. That is:

$$mwl = a \cdot MWL \quad \text{or} \quad mhhw = a \cdot MHHW \qquad (3)$$

or, on a particular day when the tide is H at the Reference Port it will be h at the Secondary Port where

$$h = a \cdot H \qquad (4)$$

This only works if the reference levels at the two ports are at the same tidal surface, as they are in Figure 1 where they are both at LAT. In the new proposed tide tables all predictions and all tabulated levels are relative to LAT. An extension to this model, where the reference levels of neither the Reference Port nor the Secondary Port are at LAT, is described in the Australian Tide Tables. In this paper it is assumed that the Reference Port will always be at LAT.

Chart Datum

The datum for tidal predictions must be the same as the datum for charted depths since the total depth of water needed by mariners and others is found by adding the two together.

The chart datum established for individual tide stations is determined by analyzing the tidal record collected at the site, usually during a hydrographic survey. The length of record can be a few days to several months and the analysis can range from a few simple calculations to a sophisticated constituent analysis inferred from a nearby permanent tide gauge. In the past the chart datum was set equal to the elevation of LLWLT. In the future the chart datum will be set to LAT. The accuracy of the result can vary widely. However, once the chart datum elevation is established and is used to correct the soundings from a field document for use on a nautical chart, the chart datum, good or bad, is "locked in" and can't be changed unless the affected soundings are corrected on a new edition or a new chart. If a subsequent more accurate tidal analysis shows that the original chart datum is in error it can't be changed because it represents the only link between the depth on the chart and the tidal predictions in the tide tables. In the old tide tables these differences were hidden in the Secondary Port differences. In the proposed new tide tables the CD correction is tabulated in the new Table 1. That is, equation (4) above becomes:

$$h = a \cdot H + \text{CD Correction} \qquad (5)$$

This equation is the basis for the Procedures for Predicting Tides at Secondary Ports described later.

Not only do tidal ranges differ between reference and secondary ports, the times of high and low tide differ as well. In the three tide tables referenced earlier, they tabulate a single time correction for both high and low tide. In Canada there are areas where this approach would result in unacceptable errors in secondary port predictions – e.g. St. Lawrence River. In the proposed new Canadian Tide Tables both high and low tide time corrections are tabulated.

As previously mentioned, it is generally accepted that the accuracy of a LLWLT or LAT determination is about 0.3m. Therefore, during this project if the difference between LAT and the existing Chart Datum was less than 0.3m it was assumed that they are equal and the CD correction was set to zero; otherwise it was retained.

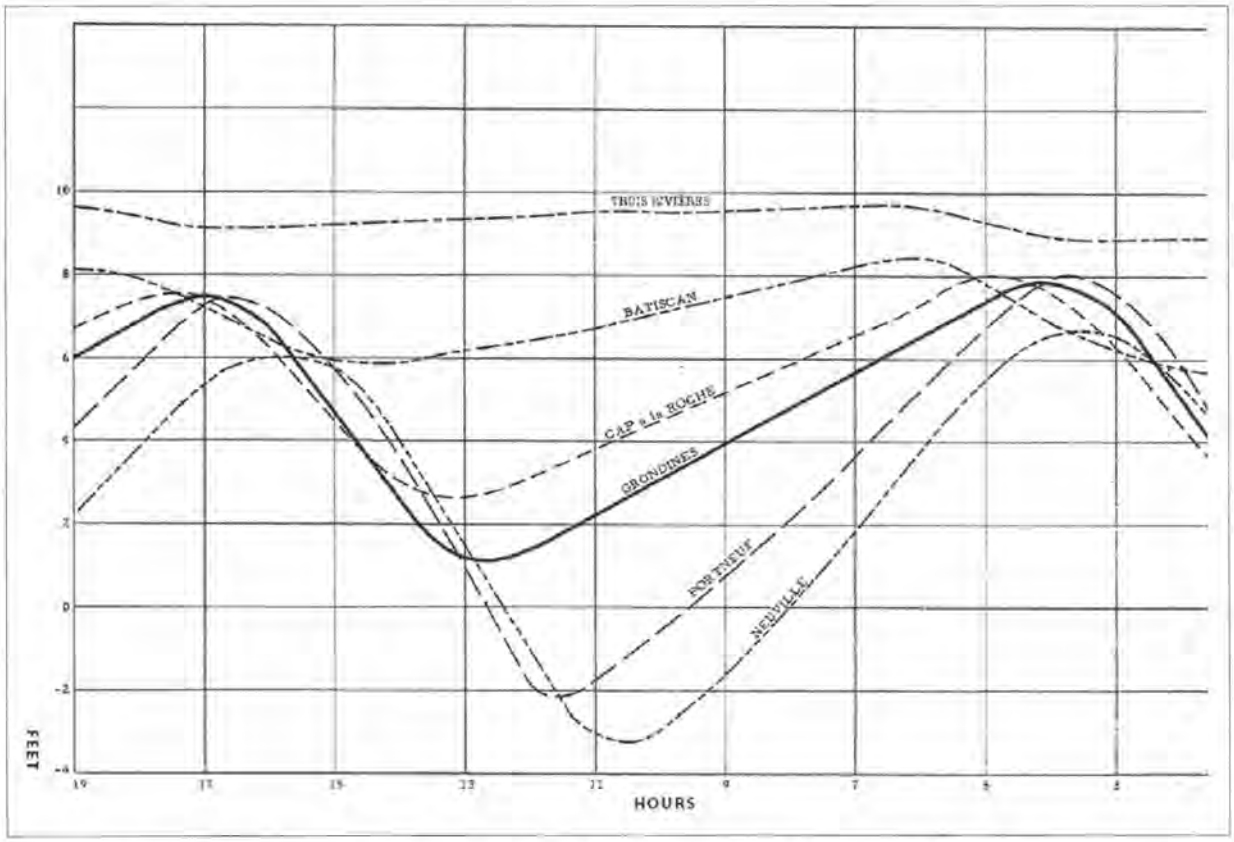


Figure 2: In this figure, taken from Tides in Canadian Waters, the tidal curve of Neuville is nearly a simple sinusoidal semi-diurnal tide curve. Alternatively, due to shallow water and river effects, the other curves assume a more and more pronounced saw tooth shape. If Neuville was used as a reference port for predicting tides at the other locations it is clear that both high and low water time corrections would be needed..

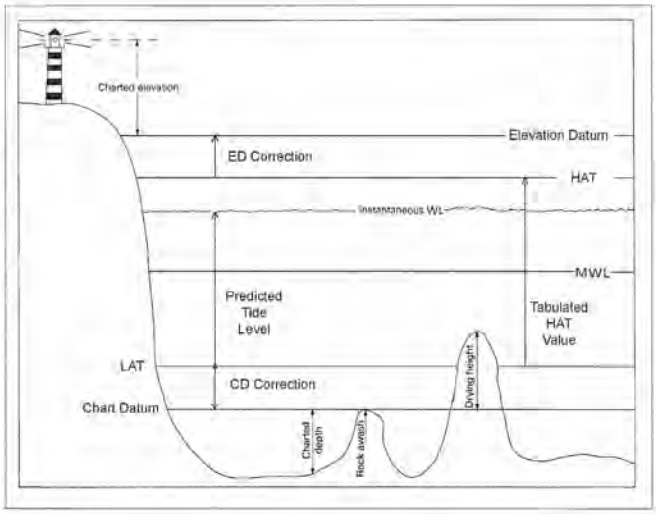


Figure 3: This figure shows the relationships among the various tide levels, datums and datum corrections discussed in this paper.

Elevation Datum

The relationship between CD and LAT (or LLWLT in the past) as described above is well understood. What isn't so well understood is the fact that exactly the same situation exists at the high water level. That is, if a tidal record was used in the past to calculate the elevation of HHWLT (HAT in the future), once that elevation of HHWLT was used to correct elevations or clearances for portrayal on the chart that value of HHWLT became 'locked in' as the official datum for elevations. If a subsequent more accurate tidal record showed that the original value of HHWLT was incorrect there was no way of distinguishing the new from the old HHWLT other than by dates or other indirect methods.

This problem becomes more pressing with the transition to LAT/HAT since the proposed new tide tables will show the elevation of HAT derived directly from the tidal constituent data. What should be done if HAT, the new target elevation datum, differs from the old elevation of HHWLT by more than 0.3m?

The simplest and most rigorous approach is to introduce an Elevation Datum (ED) that works for the high water the same way Chart Datum works for the low water, including the addition of an ED Correction to the tide tables. This is the approach that was used in this project. That is, the present 'official' elevation of HHWLT was used to establish the elevation of ED. When HAT was computed from the tidal constituents it was compared with the elevation of ED and if the difference was less than the accepted value of 0.3m the ED Correction entry was set to zero. If the difference was greater than 0.3m that difference was entered in the ED Correction column in the tide tables.

Preliminary calculations were done for one area in each of the seven volumes of the tide tables using the vector-averaged results described earlier. The tidal predictions, computed with respect to LAT and incorporating the ED and CD corrections, will then preserve the link between the tide tables and the chart. As time goes on and new charts and new editions are compiled, and CD and ED are redefined as LAT and HAT, the CD and ED corrections in the tide tables will be set to zero.

With the ED Correction in the tide tables, elevations and clearances for a particular time and place will be computed as follows:

Actual Elevation = Charted Elevation + HAT + CD Correction + ED Correction – Predicted Tide (6)

A description of this calculation is presented as user procedures at the end of Appendix 2 in the style of the existing tide tables.

Proposed New Procedures for Predicting Tides at Secondary Ports

The proposed new Procedures for Predicting Tides at Secondary Ports are different from the existing procedures in that they involve multiplying the reference port tidal heights by a Ratio Correction. While a multiplication may seem more difficult, this is offset by a number of improvements such as; only one look-up table (so no flipping back and forth between tables), no decisions to be made about which correction to use depending on the range of the reference port tide and, finally, the introduction of a simple calculation form with lettered boxes to guide the user through the calculation procedure. The new proposed procedures have been written in the style of the existing tide tables and are found in Appendix 2.

New Secondary Port Table and Sample Calculations

A key element of the proposed new procedures is the consolidation of the existing three tables 1, 2 & 3 into one Table 1, which contains all the information necessary to do the secondary port calculations. The user only needs to extract the reference port tides from the daily tables and find the page in Table 1 where the secondary port information is listed; all the necessary information is on that page. The vector averaged constituents were calculated for the reference ports for a selected set of areas, one from each volume of the tide tables. The preliminary reference levels for most of the secondary ports in those areas were also calculated along with high and low water time differences. Mock-ups of the new proposed Table 1 for each of those areas were prepared; two samples are presented as Figures 4 and 5. Constituent files were unavailable for a number of entries in the tide

tables. Solving that problem was beyond the terms of reference of this work. However, several tidal stations within the selected areas that were not in the tide tables had constituent files. They have been added to the mock-ups below in blue. *[Ed Note: the 2 lines in blue have been highlighted light gray due to printing requirements]*

For each volume and area of the tide tables just described, predictions were done for two ports for two days each, using the existing method, the new proposed method and the CHS TCWL program using the constituent files obtained from the Marine Environmental Data Service (MEDS). With such a small sample it is hard to draw many significant conclusions but two observations are:

a. The accuracy of the ratio method is comparable to the existing secondary prediction method.
b. Quite often the predictions from the existing method and the ratio method differed from the TCWL predictions by the same amount. This is probably due to the fact that the results of the two secondary port prediction methods are based on the reference port predictions while the TCWL results are based only on the port's constituent data.

TABLE 1
INFORMATION AND TIDAL CORRECTIONS
RENSEIGNMENTS ET CORRECTIONS DES MERÉES

SECONDARY PORTS																PORTS SECONDAIRES
INDEX NO.	PORT NAME	TIME ZONE	POSITION POSITION		TIME DIFFERENCES DIFFÉRENCE DE L'HEURE		CORRECTIONS CORRECTIONS			HEIGHT ABOVE LAT LA HAUTEUR AU-DESSUS DE PBMA					
NO. D'INDEX	NOM DE PORT	FUSEAU HORAIRE	LAT. N. LAT. N.	LONG. W. LONG. O.	HW MH	LW MB	RATIO RATIO	CD	ED	HAT PHMA	MHHW PMSM	MLHW PMIM	MWL NMIE	MHLW BMSM	MLLW BMIM
			° '	° '	h. min.	h. min.		m	m	m	m	m	m	m	m
	AREA/ RÉGION 2	**ATLANTIC COAST OF NOVA SCOTIA**													
0576	**POINT TUPPER pages 28-31 SD**	**+4**	**45 36**	**61 22**	**RECORDED EXTREMES EXTRÊMES ENREGISTRÉS 2.6**	**-0.5**				**2.1**	**1.7**	**1.6**	**1.1**	**0.5**	**0.4**
	CHEDABUCTO BAY														
0555	CANSO HARBOUR	+4	45 20	61 00											
0560	GUYSBOROUGH	+4	45 23	61 30											
0563	SAND POINT	+4	45 32	61 16											
	AREA/ RÉGION 3	**CAPE BRETON ISLAND**													
	STRAIT OF CANSO														
0570	PORT HASTINGS	+4	45 39	61 24	+0 02	-0 04	0.98	0.0	0.0	2.0	1.6	1.5	1.0	0.4	0.3
	ATLANTIC COAST														
0580	ARICHAT	+4	45 31	61 02	-0 02	-0 04	0.94	0.0	0.0	1.9	1.5	1.4	0.9	0.3	0.3
0582	PETIT-DE-GRAT	+4	45 30	60 58	+0 06	-0 05	0.99	0.0	0.0	2.0	1.7	1.5	1.0	0.4	0.3
0585	CANNES	+4	45 38	60 58	+0 15	+0 13	0.91	0.0	0.0	1.8	1.5	1.4	0.8	0.3	0.2
0587	ST. PETERS BAY	+4	45 39	60 52	NO CONSTITUENT FILE- TIMES AND LEVELS COULD NOT BE COMPUTED										
595	FOURCHU	+4	45 43	60 15	-0 07	-0 23	0.80	0.0	0.0	1.6	1.3	1.1	0.7	0.3	0.2
0600	LOUISBOURG	+4	45 55	59 58	+0 09	-0 09	0.84	0.0	0.0	1.9	1.5	1.4	0.9	0.4	0.4
40555	BANQUEREAU	+4	44 35	57 41	+0 23	-0 17	0.74	0.0	0.0	1.4	1.2	1.0	0.6	0.2	0.2
0612	**NORTH SYDNEY pages 32-35 MSD**	**+4**	**46 13**	**60 15**	**RECORDED EXTREMES EXTRÊMES ENREGISTRÉS 2.3**	**-0.3**			**0.0**	**1.5**	**1.2**	**1.1**	**0.8**	**0.4**	**0.3**
0605	GLACE BAY	+4	46 12	59 57	NO CONSTITUENT FILE- TIMES AND LEVELS COULD NOT BE COMPUTED										
0610	SYDNEY	+4	46 09	60 12	+0 03	+0 02	0.95	0.0	0.0	1.3	1.1	0.9	0.6	0.4	0.2
0621	TABLE HEAD	+4	46 20	60 22	-0 03	-0 03	0.92	0.0	0.0	1.3	1.1	1.0	0.7	0.4	0.2
0622	DUFFUS POINT	+4	46 17	60 25	-0 17	-0 12	0.44	0.0	0.0	0.6	0.6	0.5	0.4	0.2	0.2
0623	BLACK ROCK POINT	+4	46 18	60 24	+0 03	+0 00	0.89	0.3	0.0	1.2	0.9	0.8	0.5	0.3	0.1
0625	ST. ANNS HARBOUR	+4	46 16	60 36	NO CONSTITUENT FILE- TIMES AND LEVELS COULD NOT BE COMPUTED										
0630	INGONISH FERRY	+4	46 38	60 23	+0 04	+0 18	1.00	0.0	0.0	1.3	1.1	1.0	0.7	0.4	0.2
0635	NEIL'S HARBOUR	+4	46 48	60 19	+0 11	+0 15	0.86	0.0	0.0	1.2	1.0	0.9	0.6	0.4	0.2
0638	DINGWALL	+4	46 54	60 28	+0 07	+0 10	0.80	0.0	0.4	1.1	0.9	0.8	0.6	0.4	0.2

Figure 4: Mock-up of part of Table 1, Area 3, Volume 1 of the New Proposed LAT/HAT Tide Tables. This table replaces tables 1, 2 and 3 in the existing Tide Tables.

TABLE 1

INFORMATION AND TIDAL CORRECTIONS
RENSEIGNMENTS ET CORRECTIONS DES MARÉES

SECONDARY PORTS — **PORTS SECONDAIRES**

INDEX NO. / NO. D'INDEX	PORT NAME / NOM DE PORT	TIME ZONE / FUSEAU HORAIRE	POSITION LAT N. / LONG. W. / LONG. O.	TIME DIFFERENCES / DIFFÉRENCE DE L'HEURE HW MH	TIME DIFFERENCES / DIFFÉRENCE DE L'HEURE LW MB	CORRECTIONS / CORRECTIONS RATIO	CORRECTIONS / CORRECTIONS CD	CORRECTIONS / CORRECTIONS ED	HEIGHT ABOVE LAT / LA HAUTEUR AU-DESSUS DE PBMA HAT PHMA	MHHW PMSM	MLHW PMIM	MWL NMIE	MHLW BMSM	MLLW BMIM
			° '	h. min.	h. min.		m	m	m	m	m	m	m	m
	AREA/ RÉGION 2		**JOHNSTONE STRAIT**											
8120	**OWEN BAY pages 26-29 MSD**	**+8**	**50 19 / 125 13**	**RECORDED EXTREMES EXTRÊMES ENREGISTRÉS 4.8**	**-0.1**			**0.0**	**4.8**	**4.0**	**3.5**	**2.8**	**2.5**	**1.1**
	JOHNSTONE STRAIT SOUTH													
8180	CHATHAM POINT	+8	50 20 / 125 28	-0 29	-0 32	1.04	0.0	0.0	5.0	4.1	3.6	2.8	2.5	1.2
8195	KNOX BAY	+8	50 24 / 125 38	-0 55	-0 58	1.02	0.0	0.0	4.8	4.0	3.5	2.8	2.3	1.2
8120	**ALERT BAY pages 36 - 39 MSD**	**+8**	**50 35 / 126 56**	**RECORDED EXTREMES EXTRÊMES ENREGISTRÉS 5.9**	**-0.2**			**0.0**	**5.5**	**4.5**	**4.0**	**2.9**	**2.1**	**1.1**
8210	BILLYGOAT BAY	+8	50 24 / 125 52	+0 43	+0 41	0.88	0.0	0.0	4.6	3.9	3.3	2.5	2.0	0.9
8215	KELSEY BAY	+8	50 24 / 125 58	+0 36	+0 22	0.98	0.0	0.0	5.4	4.5	4.0	3.0	2.3	1.1
	JOHNSTONE STRAIT NORTH													
8233	YORKE ISLAND	+8	50 27 / 125 59	+0 24	+0 22	0.96	0.0	0.0	5.3	4.4	3.9	2.9	2.2	1.1
8245	PORT NEVILLE	+8	50 30 / 126 05	+0 29	+0 25	0.99	0.0	0.5	5.1	4.3	3.8	2.8	2.0	1.0
8250	PORT HARVEY	+8	50 34 / 126 16	+0 17	+0 13	0.95	0.0	0.5	4.9	4.1	3.6	2.6	1.9	0.9
	CLIO CHANNEL													
8258	LAGOON COVE	+8	50 36 / 126 19	+0 10	+0 07	1.13	0.0	0.6	5.7	4.9	4.3	3.0	2.0	1.0
	BROUGHTON STRAIT													
8290	PORT MCNEILL	+8	50 36 / 127 05	-0 01	+0 04	1.01	0.0	0.7	5.1	4.4	3.8	2.7	1.8	0.9
	AREA/ RÉGION 3		**QUEEN CHARLOTTE STRAIT**											
	KNIGHT INLET													
8310	GLENDALE COVE	+8	50 40 / 125 44											
8325	CEDAR ISLAND	+8	50 39 / 126 41											
	QUEEN CHARLOTTE STRAIT EAST													
8340	SUNDAY HARBOUR	+8	50 43 / 126 42											
8347	KWATSI BAY	+8	50 51 / 126 14											
8348	KINGCOME INLET	+8	50 54 / 126 11											
	SUTLEJ CHANNEL													
8364	SULLIVAN BAY	+8	50 53 / 126 50											
8271	JESSIE POINT	+8	50 57 / 126 48											
	DRURY INLET													
8379	STUART NARROWS (ENT.)	+8	50 54 / 126 54											
8384	JENNIS BAY	+8	50 55 / 127 01											

Figure 5: Mock-up of part of Table 1, Area 2, Volume 6 of the New Proposed LAT/HAT Tide Tables. This table replaces tables 1, 2 and 3 in the existing Tide Tables.

Chart Reviews

To learn more about the sorts of surprises actual charts might have compared with the theory discussed in the previous sections, 14 charts, 2 from each area where the new tide tables data was calculated, were studied and annotated as if they were about to be corrected to make them LAT/HAT compliant.

Several problems were encountered. Most were minor but a few were serious from the LAT/HAT point of view. About half the charts were just as expected and presented no problems at all. Three or four were also acceptable except that the tidal values on the charts had slight differences of less than 0.3 metres from the values calculated from the MEDS constituent files and/or the values in the tide tables. While not serious, if users were to notice these slight differences it might lower their confidence in the product.

Finally, three or four charts had somewhat more serious problems. It should be emphasized that the charts themselves were perfectly fine but they don't easily fit the LAT/HAT implementation model discussed in the precious sections. Many of these charts contained tidal stations that weren't in the tide tables and/or weren't in the MEDS constituent database. Both tide stations on one chart weren't in either the tide tables or MEDS - the only place they appeared apparently was on the chart.

The worst cases were two charts with tidal values in the tidal block that differed by over 0.3m from the values in the tide tables and neither of these sets of values agreed with the values derived from the MEDS constituent files. About the only conclusion that can be drawn from this exercise is that the reality of the chart, tide tables and MEDS derived tide levels isn't as clean as would be desired, and when the time comes to implement LAT/HAT each chart will have to be studied very carefully. It should be noted that these problems are independent of the change to LAT/HAT.

Implementation Plan

The proposed new tide tables design offers an even more profound advantage over the old design for implementing LAT/HAT. The big hurdle in the past has been the perception that all the charts would have to be converted to LAT/HAT and simultaneously released with the new LAT/HAT tide tables. With the introduction of the CD and ED corrections explicitly in the new Table 1 it may be possible for the CHS to become fully LAT/HAT compliant in the short term without needing to change a single chart.

This can be accomplished via an appropriately worded Notice to Mariners once the new tide tables are published. With both the CD and ED Corrections available, the tide tables are fully compatible with all the values (i.e. depths, elevations and clearances) on the chart. The only tidal information that is incompatible with LAT/HAT is the terminology in the chart Depths Note and Elevations Note and the headings and tide levels in the Tidal Information Block. Presumably a suitably worded Notice to Mariners could be issued when the new tide tables are published explaining that the depth and elevation numbers can be used with the tide tables and that the CHS is in the process of correcting the terminology on the charts. In the interim, the Notice to Mariners could explain that the expression "Lowest Normal Tide" in the Depths Note should be deleted, the expression "Higher High Water, Large Tide" in the Elevation Note should be replaced with "Elevation Datum" and the Tidal Information Block should be deleted in favour of the tidal information in the tide tables.

There will be a need to educate clients by communication activities other than by NTMs. These could include meeting with major client groups, the development of brochures, the use of the CHS website, and presentations at various venues such as conferences and advisory meetings.

The implementation plan could proceed in a phased manner as follows:

Implementation Phase Zero

Before anything else can be done, the largest and most urgent task is the redesign of the tide tables and the population of Table 1 with new data. The main effort would be the continuation of the calculation of the Reference Port Vector Averaged Constituents and the calculation of the LAT/HAT based water levels and time differences for all the Secondary Ports. A very difficult part of this work may be dealing with discrepancies and missing data. Since nothing else can be done until this task is underway it is being called Phase Zero.

Implementation Phase One

Once an Elevation Datum has been defined and an ED Correction has been added to the tide tables, the user has all the information necessary to calculate actual water depths and actual clearances using the new LAT/HAT based tide tables and the existing nautical chart. The only problem is the terminology on the chart. And, once the new tide tables are published, it may be possible for the CHS to become LAT/HAT compliant in the short term without needing to change a single chart via an appropriately worded Notice to Mariners as explained above.

Implementation Phase Two

Once Phases Zero and One have been completed the urgency presumably will be diminished and the CHS is left to implement Phase Two at a more leisurely pace depending on how long it is willing to live with incompatible terminology on its charts. The main focus will then be to remove '(Lowest Normal tide)' from the Depths note, replace 'Higher High Water, Large Tide' with 'Elevation Datum (Year)' in the Elevation Note, and replace the Tidal Information Block with the new format and new data provided by the respective tidal sections. Individual charts may have specific notes or other items that will need to be changed so a careful review of each chart will be needed. Also, changes will be needed to other publications such as Sailing Directions, Chart No. 1, Tides in Canadian Waters, Cartographic Standing Orders and other internal standards and training documents.

It is estimated that it would take about 1.5 days per digital chart to implement and quality check the title changes mentioned above and, for a clean set of charts (i.e. no data problems of the sort mentioned in the previous section), it is estimated that it would take between 1 and 2 person years to complete the job.

Implementation Phase Three

Phase Three falls more in the realm of ongoing maintenance in the model described thus far. It consists of systematically and/or as opportunity permits, adjusting all the elevations and clearances to be relative to HAT. i.e. adjusting them by the amount of the ED Correction in the tide tables. The result will be that the ED correction in the tide tables will become zero. Similarly, as new charts and new editions are compiled, CD Corrections would set to zero.

Recommendations (to complete Phase Zero)

1. Finish the redesign of the new tide tables:
   - compute vector averaged constituents for the remaining Reference Ports,
   - compute HAT, MHHW, MLHW, MWL, MHLW, MLLW, LAT and CD and ED corrections for the remaining Secondary Ports,
   - where no tidal constituents exist, devise a method for deriving these levels from the existing information in the tide tables and tidal records in MEDS and the regions,

- redesign and populate the new Table 1 with the new data.

2. In parallel with item 1, carry out further, more extensive tests of the accuracy of the proposed new Range Ratio method.
3. Send samples of the new Procedures, Introduction and Table 1 to a number of users from a cross section of the marine community for their comments. Indeed, a complete mock-up of a few volumes of the new tide tables could be constructed for this task.
4. Based on the results from the last three tasks, rewrite and reorganize the new tide tables.
5. Study another 25 or so charts from across the country to try to identify potential problems with the implementation plan and modify the plan to deal with them.

Appendix I – IHO Chart Datum Technical Resolution and Discussion

(Sections of particular importance to the CHS are underlined)

Annex E to CL 80/2004
S3/1401/WG

A 2.5 DATUMS AND BENCH MARKS

1. It is resolved that elevations on shore, including those of lights, should his referred to a HW datum or Mean Sea Level (MSL). The datum used should be clearly stated on all charts.
2. a) It is resolved that the datum for tide predictions shall be the same as chart datum (datum for sounding reduction). It is further resolved that the Lowest Astronomical Tide (LAT), or as closely equivalent to this level as is practically acceptable to Hydrographic Offices, be adopted as chart datum where tides have an appreciable effect on the water level. Alternatively the differences between LAT and national chart datums may be specified on nautical documents. If low water levels in a specific area frequently deviate from LAT, chart datum may be adapted accordingly.
1. b) It is resolved that Highest Astronomical Tide (HAT) be adopted as the datum for vertical clearances where tides have an appreciable effect on the water level. Alternatively the differences between HAT and national datums for vertical clearances may be specified on nautical documents. If high water levels in a specific area frequently deviate from HAT, the datum for vertical clearances may be adapted accordingly. It is further resolved that a HW datum be used far vertical clearances in non tidal waters.

Notes:

i) LAT (HAT) is defined as the lowest (highest) tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. It is recommended that LAT and HAT be calculated either over a minimum period of 19 years using harmonic constants derived from a minimum of one year's observations or by other proven methods known to give reliable results. Tide levels should, if feasible, reflect the estimated error values obtained during the determination of these levels.

ii) In non tidal waters, in order to allow the development of regional solutions, it is recommended that a range of low/high water definitions of the lower/upper 94-100 percentile be adopted.

3. It is resolved that chart datums (datums for sounding reduction), the datums of tide prediction and other tidal datums shall always be connected with the general land survey datum, and, in addition, with a prominent and permanent fixed mark in the neighbourhood.
4. It is resolved that ellipsoidal height determination should be made at vertical reference marks used for tidal observations, in order to support the production of seamless data sets; i.e. to allow the translation between data sets with differing vertical datums. It is further resolved that such observations should relate to a geocentric reference system, preferably the World Geodetic System 1984 (WGS84).

G 2.1 TRANSLATION OF HEADING, etc.

1. It is recommended, principally for those Tide Tables which are not published in Roman characters, that the headings of divisions and columns include a translation in English, French or Spanish, in order to increase the international usefulness of the publication.

Discussion

Paragraph 1 - Elevations on shore

The CHS addresses elevations in tidal waters as described, so, in this case, the CHS already is compliant with the resolution. However, as discussed below, some changes to the terminology used in some CHS documents will be needed. In non-tidal waters the CHS portrays elevations relative to Chart Datum and has stated that it will continue to do so because of the large number of charts that would have to be changed.

TR Paragraph 2(a) - Chart Datum

The first sentence states "It is resolved that the datum for tide predictions shall be the same as chart datum (datum for sounding reduction)." This is already an internationally recognized standard and has been in effect within the CHS for many years.

A close study of the rest of the above paragraph reveals that it actually presents quite a range of options and choices. These choices are:

Sentence 2: Where tides have an ***appreciable*** *effect* on water levels',

a. CD = LAT **and/or**

b. CD = 'as closely equivalent to LAT as ***practically*** *acceptable* to HOs'

and/or

Sentence 3: CD = a nationally defined datum and 'the differences between LAT and national datums may be specified on nautical documents'.

and/or

Sentence 4: If low water levels in a specific area frequently deviate from LAT, CD may be adapted accordingly.

The phrase 'appreciable effect' above essentially describes the boundary between tidal and non-tidal waters. The same techniques that have been used for years with LLWLT can be used with LAT. That is, when the tides have an appreciable effect on water levels the conventional approach to establishing and maintaining Tidal Datums is to have a defined Target Chart Datum and to adjust the actual CD to this Target CD when chart production schedules and other factors allow. Given that (a) knowledge of the elevation of LAT changes with each new set of tidal data collected and (b) it is only possible to change the CD when a New Edition of the chart is published (and there are often years between New Editions) the ability to set CD exactly equal to LAT is virtually impossible in practice. Therefore the generally accepted alternative is that it is tied to a 'practically acceptable' trigger level. The trigger to start the process in the CHS is when the difference between the existing CD and the Target CD is 0.3m or greater. This approach is already 'practically acceptable' by the CHS. So, with respect to the present CHS Target CD of LLWLT, the CHS is already using method 1(b).

A change of the CHS Target CD from LLWLT to LAT would therefore go a long way toward making CHS compliant with this TR.

It is not known whether there are areas in Canada where the option described in Sentence 4 above will be needed but it is available in case it is.

TR Paragraph 2(b) - High Water Datum

Paragraph 2 (b) offers a similar range of choices for a high water datum as described for low water datums. There are similar problems with HAT related terminology on charts and in CHS publications. The CHS doesn't presently have a term of a high water datum corresponding to Chart Datum. Canada rejected the recommendation in the last sentence of this paragraph.

TR Note (i) – Tidal Waters

The issue of how to compute high and low water datums in Canada has been and continues to be addressed by researchers in the CHS. It has been found that a one-year analysis does not always yield a stable set of tidal constituents, due to non-tidal influences such as el Nino. The computed values of the LAT and HAT are quite stable if a stable set of constituents is used. The computation of stable values of LAT/HAT appears to be well in hand because of on-going research within the CHS. The use of vector-averaged constituents as noted above will fulfill the conditions of note (i).

TR Note (ii) - Non Tidal Waters

This approach is already being used by the CHS in non-tidal waters.

TR Paragraph 3 - Land Survey Datum

The CHS rejected this paragraph because in much of Canada, especially in the west and the Arctic, there are no land survey networks.

TR Paragraph 4 – Ellipsoidal Height Determination

Paragraph 4 is already a well established component of CHS tidal survey work. The data collected has been very useful in quality controlling the chart datum elevations of older stations in the vicinity of new stations.

Appendix 2 – Proposed Secondary Port Prediction Procedures in the Style and Format of the Existing Canadian Tide and Current Tables

Summary of Secondary Port Prediction Procedure

The Secondary Port Prediction Procedure will be described in detail with an example below. It consists of 4 steps as follows:

1. find the times and heights of the tide from the Reference Port daily predictions for the Reference Port highlighted in Table 1 above the Secondary Port for which predictions are needed.

2. multiply the heights from step 2 by the RATIO correction listed in the Secondary Port row.
3. add the CD correction tabulated in the Secondary Port row
4. correct the Reference Port times for high and low water by the high and low water time corrections listed in the Secondary Port row.

This will give you times and heights of the tides at the Secondary Port in the Secondary Port time zone and corrected to correspond with the Chart Datum of the chart being used.

Worked Example

Required: To predict the times and heights of the tides on 1 July at the fictitious port of Rock Harbour, using the sample tables on the next page.

Step 1 Find the times and heights of the tide from the Reference Port daily predictions for the Reference Port highlighted in Table 1 above the Secondary Port for which predictions are needed.

Reference Port Bay Head EST Z+5

High Waters		Low Waters	
Time	Height	Time	Height
0720	3.0	0140	1.2
1940	3.4	1310	0.9

Step 2 Multiply the Reference Port heights by the RATIO correction listed in the Secondary port row, rounded to one decimal place.

3.0 x 1.21 = 3.6 1.2 x 1.21 = 1.4
3.4 x 1.21 = 4.1 0.9 x 1.21 = 1.1

Step 3 Add the Chart Datum (CD) correction in the Secondary Port row.

3.6 + 0.2 = 3.8 1.4 + 0.2 = 1.6
4.1 + 0.2 = 4.3 1.1 + 0.2 = 1.3

Step 4 Correct the Reference Port times for high and low water by the high and low water time corrections listed in the Secondary Port row.

	HW		
07 20		19 40	
+0 30		+0 30	
07 50	3.8	20 10	4.3

	LW		
01 40		13 10	
+0 20		+0 20	
02 00	1.6	13 30	1.3

The same example is now presented in a form format. The descriptions for the four steps above also apply to the table. The boxes are identified by letters and these letters are used in the boxes in the lower part of the form to indicate the action to take. For example, in box (d) you should multiply the values in box (b) by the value in box (e).

	Date:	1 July				
Step 1	Reference Port Data	(a) Time		(b) Height		
		HW	LW	HW	LW	
	Name	0720	0140	3.0	1.2	
	Bay Head	1940	1310	3.4	0.9	
	Secondary Port Data	(c) Time Diff's		(d) Height (b) X (e)		(e) RATIO Corr'n
	Name			3.6	1.4	
Step 2	*Rock Harbour*	+0 30	+0 20			1.21
				4.1	1.1	
Steps 3 & 4	Secondary Port Predictions	Time (a) + (c)		Height (d) + (f)		(f) CD Corr'n
		0750	0200	3.8	1.6	
						+0.2
		2010	1330	4.3	1.3	

BAY HEAD EST Z+5

July-juillet

Day	Time	Metres	jour	heure	metres
1	0140	1.2	**16**	0230	1.3
SU	0720	3.0	MO	0825	3.0
DI	1310	0.9	LU	1405	1.2
	1940	3.4		2025	3.1
2	0245	1.5	**17**	0340	1.5
MO	0830	2.8	TU	0935	2.8
LU	1420	1.1	MA	1525	1.3
	2100	3.1		2130	2.9

Procedure for Calculating Times or Clearances

Clearances and elevations on nautical charts are given with respect to the Elevation Datum plane. That plane used to be known as Higher High Water, Large Tide. With the move to the new international standard, the plane will be called the Elevation Datum and where possible it will be set at the elevation of Highest Astronomical Tide or HAT. The tide tables list the elevation of HAT for all tide stations. At the few tide stations where there is a difference between HAT and the Elevation Datum the tide tables list an ED Correction to allow the user to calculate elevations and clearances relative to the Elevation Datum. The procedures for calculating the clearance at a required time or the time for a required clearance are described below.

To Find the Clearance for a Required Time

1. Using the procedures described above, calculate the tide height, 'Pred. Tide', for the required time at the required location.
2. Note the values of HAT, CD Correction and ED Correction from the tide tables for the required location and the Charted Clearance from the chart.
3. Calculate the Actual Clearance using the following equation:

   Actual Clearance = Charted Clearance + HAT + CD Correction + ED Correction – Pred. Tide

To Find the Time for a Required Clearance

1. Note the values of HAT, CD Correction and ED Correction from the tide tables for the required location and the Charted Clearance from the chart.
2. Calculate the required tide height 'Pred. Tide', using the Actual Clearance required, as follows:

   Pred. Tide = Charted Clearance – Actual clearance + HAT + CD Correction + ED Correction

3. Using the procedures described above, calculate the time of the Pred. Tide. LH

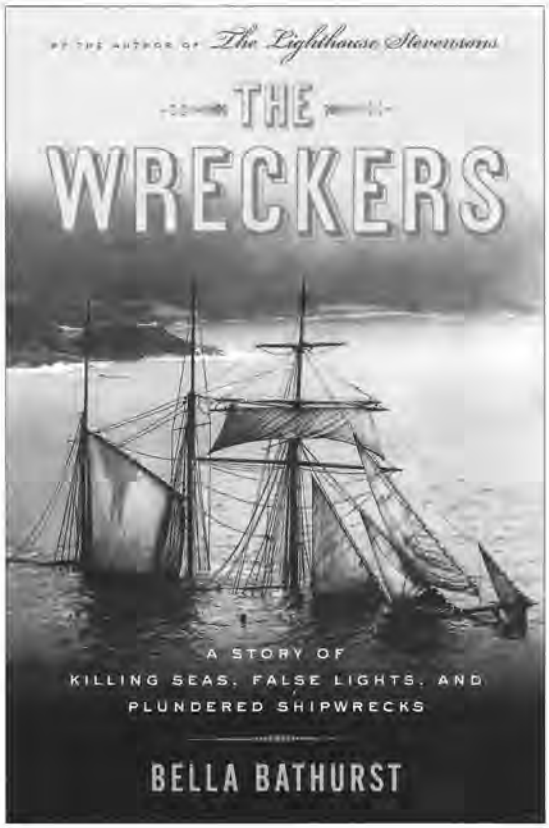
About the Authors....

Steve Grant retired from the Canadian Hydrographic Service, Atlantic region, in 1996 after 25 years as a research and development engineer in a variety of positions including Navigation Development, Regional Tidal Officer, and head of Chart Production, Data Management and Field Surveys. After retirement he formed Electronic Navigation Consulting Int'l and has done contract work for a variety of public and private sector organizations including the CHS, Canadian Coast Guard and the IHO.

Dave DeWolfe was the Regional Tidal Officer, CHS Atlantic, until he retired from the Canadian Hydrographic Service in1982 to pursue a career as a consultant. Since then, he has conducted many projects including a wide variety of tidal studies, development of specialized computer software including simulation models, database management, large multidisciplinary field programs, mathematical and statistical analysis of oceanographic, climatological and fisheries data, and modeling the environmental effects of tidal power development. Clients have included the CHS, National Research Council, Nunavik Tourism and the UN Development Program.

Grant MacLeod retired from the Canadian Hydrographic, Atlantic Region in 2006 after 35 years. He has many years of experience in Chart Production and Field Surveys. His most recent positions were as a Nautical Publications Supervisor and Quality Control Officer. After retirement, he formed True Course Consulting and has done Quality Control contracts and consulting with the CHS.

Dale Nicholson joined the CHS in 1982 and has been Regional Director of Central and Arctic Region since November 2006. Dale holds a Bachelor of Science from Mount Allison University, a Canada Lands Surveyors Commission and a Master of Business Administration from Saint Mary's University.



THE WRECKERS: A Story of Killing Seas, False Lights and Plundered Shipwrecks

Written by Bella Bathurst

Review contributed to *Lighthouse* by Fred Oliff

Published by Houghton Mifflin, New York, NY, 2005. 352 pages, b/w illustrations running with the text, bibliography, references, index

ISBN 13/EAN:978-0618416766 or ISBN 10:0618416773

This is an account of what happens to a ship when it runs aground, either by accident or by intent. It is something I had never considered, even though I work in a field where we produce a product that helps to keep ships afloat. Not having grown up in a maritime area, shipwrecks are not commonplace to my experience.

What happens when a ship runs aground? What happens to all the cargo onboard? This is what Bella Bathurst attempts to tell the readers in *The Wreckers*. She uses first-hand accounts of shipwrecking, a time-honoured tradition around the world to show what happens to cargoes of liquor, toys, automobiles, pianos, and such, when the ship carrying such cargo founders. Cargo that is found outside the ship, becoming flotsam and jetsam, is more easily identified as "belonging to no one" than is cargo removed, sometimes by force, from the holds.

As an aside, I learned that the famous author Robert Louis Stevenson was from a family of engineers, many of whom found employment with the Northern Lighthouse Board. Any country with coastline has had maritime disasters visit their shores. However, using strictly British examples, Ms. Bathurst demonstrates to the reader that "few other countries had Britain's unique combination of advantages for a wrecker – island status, a vicious coastline, plenty of expensive traffic". Some counties were famous for displaying false lights, leading many ship's captains by "a visual siren's song" to their demise. Others were inhabited by a cruel folk who would board the foundered ship and plunder it, oftentimes murdering the crew. There are accounts of the dead having jewellery removed by the 'wreckers'. To call them salvors was inaccurate. Yes, they were salvaging the cargo but they were, in fact, nothing more than petty criminals taking what they wanted. Many of the houses in those communities nearby the wrecks had roofs and floors built from timber taken from the wrecked ship. Coal, taken from colliers plying the coasts, would keep houses warm during the cold, damp British winters.

In recent years, wrecking has become less abundant due to the presence of the Coast Guard and Royal National Lifeboat Institution(RNLI) which was chartered to prevent loss of life at sea, and to put the saving of lives ahead of the plundering of ship's cargo. Lloyd's of London, too, have a vested interest in seeing that the cargo of a ship is returned to its rightful owners. The amount of liquor taken from the hold of one ship, documented in *Whiskey Galore*, is breathtaking!

I would heartily recommend this book to anyone wanting to read another side of why we want to keep ships off shoals and from running aground!

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A Canadian Volunteer Group

We invite you to the Friends of Hydrography Web Site 'http://www.canfoh.org'

The Friends of Hydrography are a small group of both retired and current Canadian Hydrographic Service (CHS) employees who believe there is a need to record and preserve the historical highlights of Canadian hydrography.

Please browse the many pages of the site to get a sense of the history of Canadian hydrography and the Canadian Hydrographic Service (CHS). If you ever worked with the CHS, or had friends who did, search the site for their names. If you don't find the name please contact us. Also, if you have photographs of ships or launches, used at any time by the CHS we would be grateful if you would share them with us.

The site is the primary distribution vehicle for Friends of Hydrography and is a work in progress. The site has grown nicely since its inception in 1998 and new information is added on an opportunity basis.

Please feel free to contact us at (CANFOH@cogeco.ca) We would be delighted to hear from you. Your questions, comments, corrections and/or contributions to the site are welcomed.

Supported by and in collaboration with the Canadian Hydrographic Association and the Canadian Hydrographic Service

La Barque *Surveyor* Au 400e De La Ville De Québec

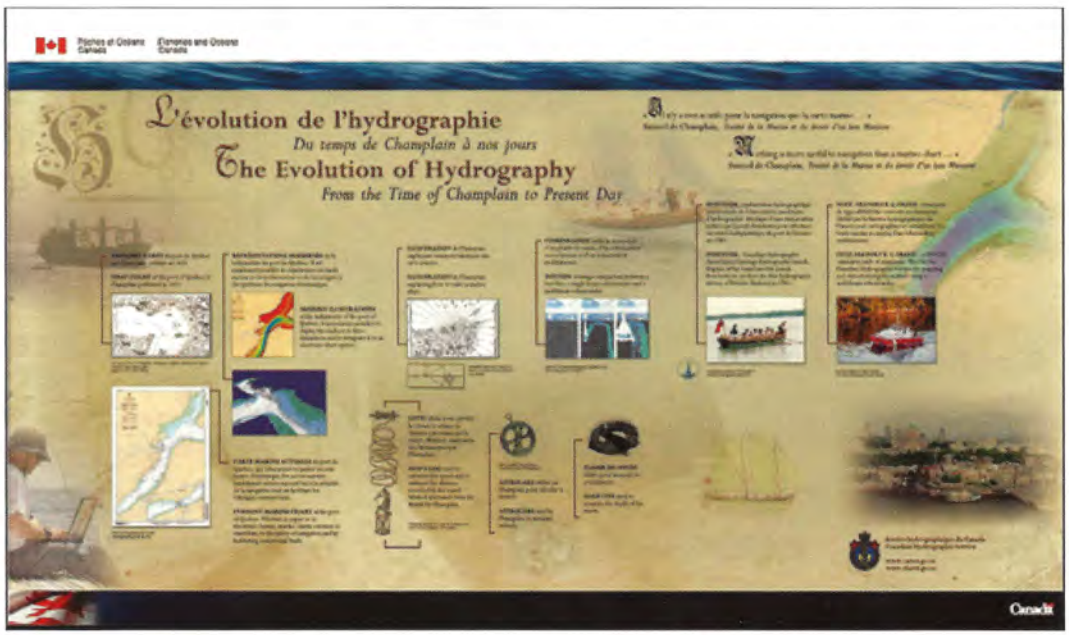
By: Normand Doucet, Service hydrographique du Canada, Région du Québec

L'année 2008 a été marquée par le 400e anniversaire de la fondation de la ville de Québec et du premier établissement permanent d'Européens francophones en Amérique du Nord.

La barque Surveyor dans le Bassin Louise à Québec

Le ministère fédéral des Pêches et des Océans a souligné par diverses activités la contribution de son personnel à la vie économique de la capitale québécoise. Entre autre, une de ces activités qui s'est réalisée conjointement avec la section du Québec de l'Association canadienne d'hydrographie (ACH), fut la présence de l'embarcation hydrographique patrimoniale SURVEYOR, une réplique des barques de service utilisées aux 17e et 18e siècle et appartenant à la section Centrale de l'ACH. Normand Doucet, du Service hydrographique du Canada à Mont-Joli, habillé d'un costume de l'époque de la colonie française et personnifiant Jean-Baptiste Franquelin, a animé les activités sur le quai, à l'aide de panneaux d'information. Il a aussi démontré, dans l'embarcation sur l'eau et en faisant manier le plomb de sonde et le sextant, les techniques hydrographiques du temps.

Nommé Hydrographe-du-Roi en 1687, Jean-Baptiste Franquelin (1651-1718) a laissé un témoignage exceptionnel de la présence française en Amérique du Nord. Professeur de navigation sous la Marine française, premier Hydrographe-du-Roi à s'établir en Nouvelle-France, ce cartographe méconnu a été l'auteur d'une cinquantaine de cartes manuscrites, datées entre 1674 et 1708, mais non publiées. Il a principalement consigné les explorations de Louis Jolliet et de Cavelier de La Salle, en illustrant ainsi le territoire allant du fleuve Saint-Laurent jusqu'au fleuve Mississippi. Ses services étaient grandement appréciés par le Roi-Soleil Louis XIV.



Panneau d'information monté sur une colonne Morris

C'est au cours d'une dizaine de sorties sur l'eau, d'environ deux heures dans le Vieux-Port de Québec et sous la gouverne de l'éminent Franquelin, que 75 visiteurs costumés ont participé aux manœuvres à la rame et expérimenté les anciennes techniques de levés hydrographiques. Profitant des escales aux abords de la Grande place du 400e, au cœur des festivités, les descriptions de l'évolution de l'hydrographie à une foule globale de plus de 3600 personnes ont suscité beaucoup d'étonnement et de curiosité.

La foule attentive aux explications de l'hydrographe du Roi Louis-Jean-Baptiste Franquelin (alias Normand Doucet, SHC-Québec)

Un équipage prêt et enthousiaste à vivre une "expérience de travail" unique

Du 23 juillet au 2 août, une autorisation spéciale avait été accordée par le Maître du port afin que l'embarcation à rames puisse se déplacer à l'intérieur du bassin Louise du Vieux-Port de Québec. Selon la réglementation en vigueur, seulement les déplacements à moteur sont autorisés dans ce bassin intérieur. Ces sorties à rames étaient tout à fait exceptionnelles.

Cette réalisation conjointe du Service hydrographique du Canada et de l'Association canadienne d'hydrographie a permis de démontrer l'apport des technologies maritimes dans le développement socio-économique de la colonie grâce à une cartographie minutieuse des voies d'accès maritimes. De plus, les échanges avec les visiteurs ont fait découvrir à plusieurs jeunes l'éventail des professions passionnantes entourant la cartographie marine.

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Individual members of the Canadian Hydrographic Association and other recognized National Hydrographic Societies will receive the same registration discount as THSOA members.

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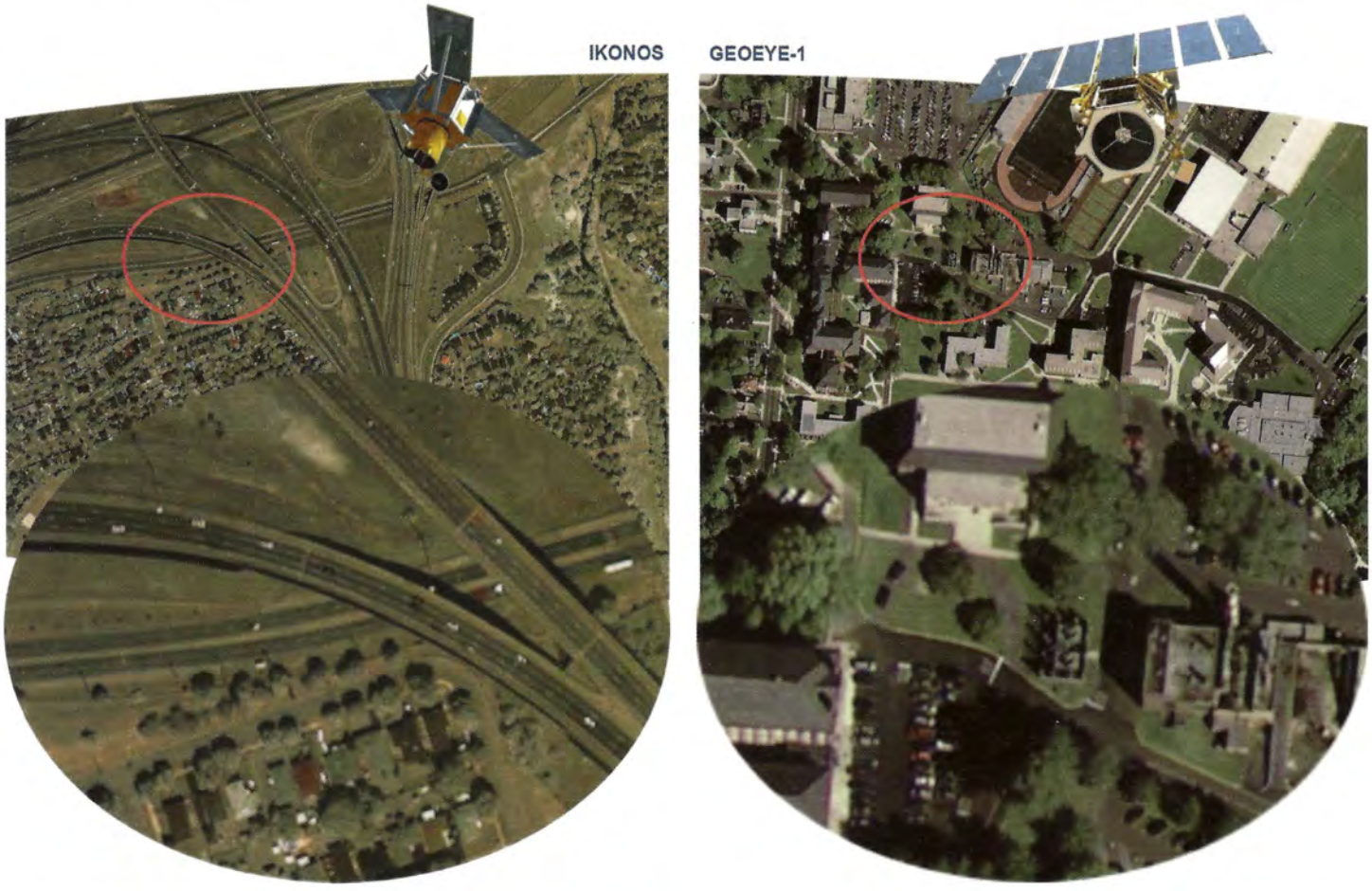

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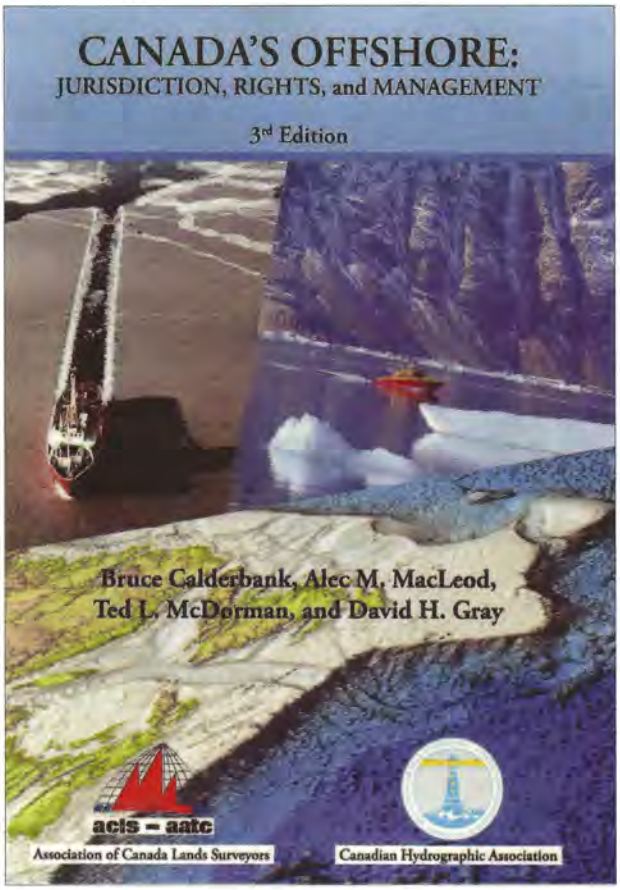
Bruce Calderbank, Alec M. MacLeod, Ted L. McDorman, and David H. Gray



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CHC 2008 Recap

By: Lighthouse Staff

Last May 5-8th, the Canadian Hydrographic Association (CHA) in partnership with the Association of Canada Lands Surveyors (ACLS) and the Canadian Hydrographic Service (CHS) jointly hosted the biennial Canadian Hydrographic Conference and the National Surveyors Conference. This was the first ever joint conference. Appropriately, the conference theme was "Bringing Land and Sea Together".

The Empress Hotel

Victoria Conference Centre

support of sustainable land management, innovations in cadastral technology, data integration and the extension of survey applications to other disciplines. There were also several joint sessions under the heading of "Mapping from Land to Sea". The keynote speaker was Canadian Astronaut Roberta Bondar, who spoke of her experience in space and, just as importantly, on Earth. She left an impression on the audience with her images of Earth taken from both space and from earth. She graciously supplied copies of her latest work, which were given to conference speakers and moderators.

Over 500 delegates and exhibitors attended the event that was held at the Victoria Conference Centre, adjoining the majestic Empress Hotel in the heart of Victoria, British Columbia. On the water side, technical sessions consisted of the themes of future charting, vertical reference systems, safe and accessible transportation corridors, and issues related to the law of the sea initiatives. The land side held sessions on cadastral systems in

Delegates enjoying the BC sunshine

Beyond the technical sessions, there were also workshops held prior to the conference on topics such as the Hydrographic Product Database (HPD), Building Trust and Business with the Aboriginal Community, SonarWiz.MAP, 3D Visualiazation Using Fledermaus, Generic Sensor Format (GSF) Community Review, Enabling Hydrographic Offices with ESRI Enterprise GIS Technology, Vertical Datum Transformations, Uncertainty Management, Administering Marine Spaces, CARIS Ping to Chart Solutions, Side Scan Sonar Data Interpretation and Mosaic Processing, and HYPACK. Throughout the conference, Victoria Harbour served as the setting for on-water demonstrations. The NOAA Ship *Rainier* was available for tours and the CHS survey launch *Otter Bay* was used for demonstrations, as were other industry craft. Business meetings were held by both the CHA and the ACLS.

The Otter Bay heads out for a demonstration

The exhibition hall was a major draw, hosting exhibits at 56 booths. The hydrographic, land survey and related disciplines were well represented by the likes of Kongsberg, Applanix, Knudsen, Caris, McQuest, Fugro Pelagos and many more. The hall was also used as the venue for break time refreshments and a conference social.

The social activity was not confined to the conference area proper. Many forays were made to areas such as golf clubs, local restaurants and destinations around the beautiful British Columbia Capital. The conference organizers deserve praise for putting on a highly successful conference, in terms of attendance, efficiency, and boldness. The sponsors also deserve to be honoured for their support.

Conference abstracts, papers and presentations are still available online at chc2008.ca. Upcoming hydrographic conferences include U.S. Hydro 2009, May 11 – 14, Norfolk, Virginia, USA and the Canadian Hydrographic Conference 2010, June, Quebec City, Quebec, Canada.

The always bustling Exhibitor's Hall

The NOAA ship Rainier in Victoria Harbour

THE CANADIAN HYDROGRAPHIC ASSOCIATION AWARD
LA BOURSE DE L'ASSOCIATION CANADIENNE D'HYDROGRAPHIE

(Established. 1992 / Établie en 1992)

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Application Criteria

1. The applicant must be a full time student in an accredited survey science program (the program must have a Hydrographic Survey or a Geographic Information Systems, Cartographic or Land Survey component) in a university or technological college anywhere in Canada. Environmental studies only will not be eligible. The Manager of this award will determine the eligibility of the program for the award.

2. The award will be available to undergraduate students in a degree or diploma program that conforms to the basic subject topic. The applicant will be required to submit a transcript of his/her most recent post secondary marks at the time of application. The marks must indicate an upper level standing in the class and under no condition less than 70%.

3. The award will be presented to an applicant who can demonstrate a bona fide financial need, coupled with an above average academic performance as stated above.

4. The applicant will be required to write a short paragraph explaining his/her financial need in a clear, concise manner on the application form or, if necessary, attached piece of paper. The importance of this aspect of the application is emphasized.

5. The award application will be submitted to the Canadian Hydrographic Association by June 30 each year and to the address in item 11 below.

6. The value of the award is $2,000. There is one award only each calendar year. Only the winner will be notified.

7. The successful applicant will be issued with a special Hydrographic Association Certificate, duly framed, at the time the award is made. He/she will also receive a medallion with the Hydrographic Association Crest and have his/her name mounted on a perpetual winner's plaque. A picture of the plaque, duly inscribed will be mailed to the winner along with the $2,000 cheque during the second week of July.

8. The applicant must submit one letter of reference from an official of the university or college where the applicant spent the previous year. This letter of reference must include the address and phone number of this official.

9. An individual student may receive the award once only.

10. The successful applicant's letter of appreciation will be published in the next issue of our professional journal "Lighthouse".

11. Application will be made on the form supplied or preferably down loaded from the official CHA web site at *www.hydrography.ca* and sent to:

Critères d'admissibilité:

1. Le candidat ou la candidate doit être un étudiant ou une étudiante inscrit à plein temps à un programme reconnu en sciences géodésiques (ce programme doit inclure les levés hydrographiques ou un contenu des systèmes d'informations géographiques, de cartographie ou des levés terrestres) par une université ou un collège situé au Canada. Un programme en environnement seulement ne sera pas éligible. L'administrateur de cette bourse déterminera l'admissibilité du programme pour la bourse d'études.

2. La bourse s'adresse aux étudiants et étudiantes inscrits dans un programme menant à un diplôme collégial ou de premier cycle universitaire conforme aux disciplines de base. Le candidat doit soumettre une copie de son dernier relevé de notes post-secondaire avec sa demande. Les notes doivent être au-dessus de la moyenne de sa classe et être obligatoirement supérieures à 70 %.

3. La bourse sera remise au candidat ou à la candidate qui, de bonne foi, peut démontrer ses besoins financiers et qui respecte les exigences académiques mentionnées ci-haut.

4. Le candidat ou à la candidate devra écrire un court texte clair et concis, démontrant ses besoins financiers sur le formulaire de la demande ou, si nécessaire, sur une lettre jointe. Une grande importance est accordée à cet aspect de la demande.

5. La demande doit être soumise à l'Association canadienne d'hydrographie au plus tard le 30 juin de chaque année à l'adresse mentionnée à l'article 11 ci-bas.

6. La valeur de la bourse est de 2000 $. Il n'y a qu'une seule bourse remise par année civile. Il n'y aura que le gagnant qui sera avisé.

7. Le récipiendaire recevra un certificat spécial de l'Association canadienne d'hydrographie, dûment encadré. Il ou elle recevra aussi un médaillon à l'effigie de l'Association canadienne d'hydrographie et verra son nom ajouté sur la plaque des gagnants. Une photo de la plaque, dûment gravée sera postée au gagnant avec un chèque de 2000 $ au cours de la deuxième semaine de juillet.

8. Le candidat ou la candidate doit soumettre une lettre de référence d'un représentant de l'université ou du collège où il a suivi son cours l'année précédente. Cette lettre de référence doit inclure l'adresse et le numéro de téléphone de ce représentant

9. Un étudiant ne peut recevoir la bourse qu'une seule fois.

10. Une lettre d'appréciation du récipiendaire sera publiée dans l'édition suivante de notre revue professionnelle « Lighthouse ».

11. La demande devra être faite en se servant du formulaire prescrit ou préférablement téléchargée à partir du site internet officiel de l'ACH « www.hydrography.ca » et envoyée à :

Barry M. Lusk, Manager / Administrateur
Canadian Hydrographic Association Award Program / Bourse de l'Association canadienne d'hydrographie
4719 Amblewood Drive, Victoria, BC V8Y 2S2
luskbm@telus.net FAX / Télécopieur: (250) 658-2036 *www.hydrography.ca*

Thirty Years Of Turmoil, Stress and Achievement

By: Tom McCulloch, Hydrographic Consultant, McCulloch Hydrographic Consulting

This article has been reprinted and originally appeared in Lighthouse Edition 55, Spring 1997.

PART1: THE BIRTH OF THE CHA

(then, the Canadian Hydrographers' Association, now the Canadian Hydrographic Association)

Today, society and its government are in much upheaval, with reductions in program funding and in the staff to manage these programs. The effect is traumatic, often career threatening, and sometimes leads to job termination. A worrying, perplexing time! You probably think those lucky old-timers back at the time of formation of the CHA never faced such problems.

And you would be correct to some extent, but we did face great upheaval in society and uncertainty of direction to meet new challenges, and a feeling that we (the young whippersnappers in the CHS) were not prepared to tackle the problems of the future-particularly in relation to training for deployment of the first wave of new technology and techniques that came upon us. But also in determining proper standards for our profession – and in relating that profession to its fast growing counterparts in oceanography-physical, geological and geophysical. Additionally, there were the problems associated with the mushrooming exploitation of the ocean's hydrocarbon resources and the international move to develop a *Law of the Sea Convention* that would be recognized and adhered to by all maritime nations. All of the foregoing would impact eventually on the conduct of the hydrographic profession –and we were ill prepared.

To establish a starting point for this presentation, I have reviewed my own personal memories (fighting Alzheimer's all the way!) and picked 1963 as a suitable beginning. Other "old-timers" may start elsewhere but let them develop their own reflections at another time.

The 1960's

The formation of the Marine Sciences Branch and the inclusion of the CHS within it, and the establishment of the Bedford Institute of Oceanography in Dartmouth, N.S. began the process of national change in the hydrographic mission. The impact of that process of change on the Pacific Coast was practically non-existent. There was little transfer of technology to disturb an orderly, meticulous and conscientious profession concerned largely with accuracy and productivity in publishing nautical charts and supporting compilation of data.

However, in December of 1963 at the Dominion Hydrographer's 3rd Annual Conference in Ottawa, Dr. W. Cameron, MSB Director, stated that hydrographers' charting tasks should be extended to describe other parameters of the sea bottom. He suggested that hydrographers might eventually move into the problem of describing the sea itself as it varies from place to place and time to time. The concept was challenged in private by many, particularly on the Pacific Coast, but change was underway which would require a drastic rethink of our mission and the training and education standards that would be required to successfully tackle that mission. However, CHS on the Pacific Coast lacked day-to-day contact with the oceanographic professions that were becoming common in the east. We slumbered on and were ill-prepared for what was to come.

Senior Survey Officers Course

In the winter of 1964/65, four members of CHS took part in what was to be the last Senior Survey Officers Course run by the Survey and Mapping Branch of Energy, Mines and Resources. The four chosen to attend were Larry Murdoch, Barrie MacDonald, Mike Eaton and myself. [The selection of this group may have been a contributing factor to the demise of the course!] We were exposed to lots of survey and mapping technologies and other useful information, but what whetted my interest [and I would surmise Mike Eaton's, also] was the one-week tour of survey and mapping establishments in Washington, particularly those involved in hydrographic and oceanographic research and developments in technology and technique. This was followed by exposure to the formulation of the Computing Devices of Canada study of future CHS technical requirements as commissioned by the Dominion Hydrographer. The contrast between the exciting new developments apparently underway in hydrography elsewhere and the seemingly glacial approach to change on the Pacific Coast left me with the feeling that we were not exactly ready for the future. Decca 6F and Tellurometer were not enough!

The Massacre

In the following winter of 1965/66, an event took place that caused much personal anguish at the time but probably helped propel the CHS into facing the facts of its situation. Eight senior CHS members – DeGrasse, Corkum, Eaton, Blandford, Kerr, Wills, Sandilands and myself, were interviewed by Bill Cameron (Director, Marine Sciences Branch), Clarence Cross (Advisor to Cameron), Norman Gray (Dominion Hydrographer) and others. All of us were

pronounced unqualified to occupy the newly established position of Assistant Regional Hydrographer in Atlantic, Central and Pacific Regions. What a slap in the face, not just personally but also for the entire CHS. Here, the eight most senior and experienced field officers in the CHS were told that they were not capable of rising to senior managerial status! It was a body blow and took some time to heal. The principal message appeared to be that we all lacked the training and the education to meet Bill Cameron's exacting standards. There was blood on the floor of that boardroom!

BCR (Bureau of Classification Revision) Exercise
If all of the foregoing weren't bad enough, adding to concerns about the "uneducated hydrographers", a BCR exercise was underway to classify each and every surveyor as either a Survey Officer of a Survey Technician. The slogan "*too many Chiefs, too few Indians*" was being touted. According to this approach, the *Indians* would be the button-pushers:it was believed that many would be required to support the new technology, a wrong perception as it turned out. People frantically wrote, rewrote and rewrote again their BCR documents to ensure that they became Chief, or at least a high-ranking Indian. What games we play- and all of this brought by the Glassco Commission of the Civil Service which actually proposed "*Let the Managers Manage*" but saw its work perverted by the interpretation put upon its findings by the bureaucrats of the Treasury Board and the Civil Service Commission.

To the "massacred" and others in the CHS, the BCR exercise and the need for additional education and training appeared to complement each other, but it also made the objective more difficult to achieve.

Official Recognition of the CHA
The informal meetings of 1966 led to an agreement and an undertaking that CHS management would probably react positively to education and training proposals if they were supported by evidence of general support and agreement among hydrographic surveyors. (Having a friend at court in the CHS management helped. Mike Bolton was a strong supporter as long as we did not go the "union" route.)

In September 1966, Mike Eaton prepared a discussion paper entitled *Education for Hydrographers*, which was circulated nationally among interested hydrographers. In the paper he expressed his own views on aims, knowledge required, attitudes affecting education, methods to achieve the goals of enhanced training and education, and a suggested program for Marine Sciences Branch to adopt. All good stuff- with lots of in-house training proposed – but it would require a strong management commitment.

Meetings were held in all Regions and support developed for an announcement of the formation of an Association to promote training and education. This would be at the CHS Conference, scheduled for March 1967 in Dartmouth, Nova Scotia. I presented a paper entitled *The Educated Hydrographer* at the 1967 Hydrographic Conference which incorporated my Pacific Coast views with some of the work previously outlined by Mike Eaton. It was well received by both rank and file, and by CHS management. It led to a meeting with CHS management to determine a suitable course of action. As suggested in my paper, a committee of two persons – Nick Cleary, Education Office, Survey and Mapping Branch, and myself-were detailed to conduct a study and prepare a CHA brief on future training and education requirements for CHS.

Mike Eaton was elected the first President of the CHA at the 1967 Hydrographic Conference, and was so recognized by CHS management. A well-deserved honour in recognition of his uphill struggle to persuade hydrographers of the new need to further develop their training and experience.

CHA Education Brief
The Brief was completed in late May 1967 and forwarded to CHS management for review and, hopefully, action. The following steps were proposed:

1. Upgrading of refresher courses in physics and mathematics for existing staff.
2. A Junior Hydrographers' Technical Course as a natural progression from the basic entry course on hydrography given to recruits. Exam to be set by CHA and CHS Training Officer. Course subjects would include Survey General, Sounding, Projection, Radio Aids, Navigation and Seamanship, Tides and Tide Theory, and cartography. Three years of field service would be a prerequisite.
3. Refresher courses in-house or at university in Physics Theory, Light, Heat, Electronics, Magnetism and Mathematics, for those with the appropriate educational background.
4. Main Hydrographic Course for hydrographers with H.I.C. potential on Projection, Radio Aids (principles, errors, calibration etc.), Photogrammetry, Applied Electronics, Astronomy and Computers. Five years of field service would be a prerequisite. Exams to be set by the CHA.
5. Senior Hydrographer Course (Specialization): Geophysics, Geology, Principles of Analysis and Prediction of Tides, Physical Oceanography, etc. Exams to be set by the CHA and institution.

I quote: "The foregoing proposal by the CHA on education and training is a proposal to deal with an emergency situation, as it exists today (1967) and is

intended to stimulate the interest of both hydrographers and management in an education and training program geared to career development and offering enhanced prestige to professional hydrographers." Note: The Brief was developed while I worked up "Richardson" for her forthcoming Arctic voyage, which was to prove more exciting than most.

Response of Dominion Hydrographer

In September 1967, the CHA received the CHS response to our brief which was in the main, encouraging. However, it was suggested that our approach be modified into three steps: Junior, Intermediate and Senior. It outlined a number of suggestions which could assist in completing the CHA proposals, e.g. tuition costs, study time, assignment of in-house lectures and an emphasis on the use of the rotational year for a major part of the staff educational program.

A meeting of CHA representatives and CHS management was suggested for early October, seeking consensus and clarification on the following points: 1) recognition of other formal training, 2) details of syllabi, 3) standards of courses including examinations, 4) prerequisites to enter the various steps, and 5) PSC regulation governing tuition fees, etc.

At the October meeting, a compromise was reached. The entry level and the CHA-proposed Junior Hydrographic level (in-house) would be amalgamated, becoming Step 1; the CHA Step 4 course (in-house) would become the Step 2 course or Advanced Hydrographic Course, amalgamating our Steps 3 and 4; the CHA Step 5 (University Level) would require further study before acceptance. The readiness of CHA to conduct its own exams was discussed and left in abeyance for the immediate months ahead. The first Step 2 Course would be given during the summer of 1968. In response to CHS management questioning, CHA representatives assured them that CHA was neither a union nor a social club, but a professional association.

Events Following

At the February 1968 Hydrographic Conference in Ottawa, I was elected CHA's second President and almost simultaneously it was announced that I would be the next Regional Hydrographer of Central Region. Now I began to understand what was meant by possible "conflict of interest"! I reluctantly stepped down as CHA President in May of 1968, but continued to be involved in the education and training issue – a CHA member but on the CHS management team. That enabled my support for the CHA Step 5, which now became CHS-sponsored financial assistance to approved hydrographers working toward a university degree in a hydrographic-related program. The first Step 2 took place in-house in the winter of 1968/69. All appeared to be going forward as planned.

PART II: THE ESTABLISHMENT OF THE CHA

In 1968, the CHA could congratulate itself on persuading CHA management to adopt a three-tier approach to training and education:

1. Entry level / Junior Hydrographer – Prerequisite: three-year college diploma in surveying and mapping or equivalent.
2. Intermediate level / HIC Potential – Prerequisite: three to five years field experience.
3. Senior level / University level hydrography program – Prerequisite: both step 1 and 2 above.

The Step 3 University Degree program was pushed vigorously by the new Dominion Hydrographer, Art Collin. Several hydrographers who had been taking university courses at their own pace and expense suddenly found themselves supported fully on programme leading to a degree, and a number of other potential candidates were identified. This was a tremendous development for the future of CHS, but simultaneously it exposed a weakness in the strength of CHA and its ability to continue a partnership with CHA management in the new approach of training and education. The problem was the self-imposed task of setting CHA standards of examination at the Step 1and Step 2 levels. It had been difficult enough to contemplate how this task would be tackled prior to the announcement of Step 3, but with Step 3 in place, all the people who could best design and monitor a CHA examination system were lost to us, together with those of high potential for Step 3, who no longer saw CHA as the path to righteousness.

At one point it had looked as if CHA was subverting CHS, but now the shoe was on the other foot. A revitalized CHS scarcely needed CHA. What therefore was CHA's role to be?

The Blasted Constitution and Bylaws

The role of CHA was debated at length in every region. In Central and Pacific Region, the education and training theme was still in the forefront, but Atlantic region did not seem to have much enthusiasm. HQ obviously was content to be a social club. The one thing all could agree upon was the need for a meaningful constitution and bylaws that reflected the aims and objectives of the Association, the conditions of membership, fees, powers and duties of officers, etc. There ensued a protracted struggle that almost destroyed the CHA. Eventually it was determined that the furthering of the knowledge and professional development of CHA members could go hand in hand with advancing the development of hydrography and associated activities in Canada. A grandfather clause did not appease the disgruntled!

Newsletters

Attempts were made to publish a national CHA newsletter, starting in 1968. The first edition was a rather amateurish affair [I was the editor and publisher] with blurbs about products and a scattering of news about hydrographic events. However, by the third edition (1970), edited by Bob Golding, a more interesting pattern was developing. This edition was published just prior to the Canadian Hydrographic Conference scheduled for the spring of 1970 in Ottawa. It included a marvellous drawing of a hydrographer bellowing the word "FIX!" on the cover. It also contained some useful comments on the matters concerning members, some rather funny recollections of the massive deployment of hydrographic resources off Tadoussac in 1969. Naturally, also the infamous episodes of the offer to the Dominion Hydrographer to purchase a battleship to round off the fleet, and the hoisting of the Hotel Tadoussac Chef's desk to the jack of the hotel flagstaff-all good clean fun! Additionally, there was a copy of the syllabus for the 1970 Step 2 Course and the article on GEBCO by Al Smith. Finally, the following poetry, which is a classic illustration of the fear and cynicism that the Step 2 Course engendered in some CHS staff members:

In Sid's halls of learning we gathered
Eight others and myself
We dusted off our thinking caps
And moved them from the shelf.

For six strained weeks we sat around
With learning our objective
But management's taken Hydrography II
In quite another perspective.

They're putting up their stumbling blocks
As fast as we can jump them
But never fear the CHA
Will find a way to stump them.

The CHA's behind us boys
Never fear of that
Until we fail Step II that is.
I think I smell a rat.

Eights and sevens and fours we sit
And put up with the system
Why can't Doc Colin see what's wrong
In all his wisdom.

In Sid's halls of learning we gathered
And wrote the eight exams
Eight others and myself
Are past giving a damn.

But what about the others
Who do it all next year
What about the others
Who have so much to fear?

Although editions of the newsletter continued for some years, it almost expired in 1971 for lack of copy.

Magazines

By Edition 12 in 1975, we had graduated to publishing *Lighthouse*, now the official journal of the CHA. Earl Brown was the National President and Adam Kerr was the enthusiastic editor, with Sandy Sandilands and Mike Eaton as associate editors. The journal was a first of a new series and contained a number of very interesting articles. The introduction and the editorial strongly underlined the need for input – "*Unless you, all of you get writing and provide material, this journal will expire once again, like a codfish in the bottom of a dory.*" Articles like *SATNAV* by Mike Eaton, *The Asia Tragedy* by Mike Casey, *James Cook – Master Surveyor* by George MacDonald, *CSS Pandora II* by Sandy Sandilands and *An Antarctic Survey – Twenty Years Ago* by Adam Kerr – all made for an interesting publication.

Conferences and Publications

In 1977, *Lighthouse* graduated to publishing a special edition of the proceedings of the 16th Annual Canadian Hydrographers' Conference held in Burlington, Ontario, hosted jointly by the CHS and CHA. After ten years CHA had become part of the *establishment*. The conference was graced by the attendance of several heads of other national hydrographic offices, e.g. Rear Admiral David Haslam, UK, Rear Admiral Robert Munson, US National Ocean Survey, etc. Papers were presented on many subjects including the following: *Internationalizing of Hydrography in NE London Polytechnic*, by Allan Ingham; *Reliable Navigation through System Integration*, by D. Wells and S. Grant; *The Chlorine Car Caper* by Tony O'Connor- just to name a few. The conference was well attended, with participants from Canada, USA and Europe, and had many exhibitors. It was a financial success. The keynote address on surveying related to the exploitation of hydrocarbons in the North Sea was delivered by Rear Admiral D. W. Haslam, Hydrographer of the Royal Navy. The Fickle Finger of Fate Award was passed on to Mike Bolton from Adam Kerr at the culmination of the conference. Willie Rapatz was CHA National President at the time of this event (the 16th Annual Canadian Hydrographic Conference but the first co-hosted by the CHA.)

Many other CHA-CHS jointly hosted annual conferences followed, with special *Lighthouse* editions devoted to the conference proceedings. CHA was on a roll – in 1979 we were a co-sponsor of the First International Hydrographic Technical Conference on Ottawa, together with the CHS, FIG and CIS. This conference attracted presenters and attendees from around the globe. It was an outstanding success-in no small measure due to the part played by many individual members of CHA.

In the eighties, the CHA moved into a controlling position re: the planning and implementation structure of Canadian Hydrographic Conferences with, of course, continuing vital support from the CHS. This move took place as the National Ocean Survey of the US and Canada developed

a biannual approach to hydrographic conferences: Canada taking the odd years and the US the even years (i.e. we hosted in 1983, 1985, 1987 and 1989; the US in 1984, 1986, and 1988). They attracted much attention jointly around the world. In 1989, CHA Vancouver Branch hosted a fine conference "Discovery 89" which was internationally attended and definitely a prime example of what CHA could do almost entirely on its own- if CHS management stopped playing the role of "father knows best". We owe much to the skill and integrity of the late Gordon Murray.

As you are all aware, the 1989 conference approach ran into internal CHS/CHA politics, and conferences have lagged somewhat as successful vehicles of information transfer even with the CHS back in the driver's seat. A teleconference approach was not an outstanding success. However, in 1996 CHS hosted a very good hydrographic conference in Dartmouth, Nova Scotia which did attract large numbers of attendees. So perhaps the pendulum has started to swing back and the 1998 conference planned for Victoria will see CHA back making a strong contribution,

The CHA bylaws were amended in 1998 to change the name of the Association to the *Canadian Hydrographic Association*, to better reflect the role that nautical cartographers play in the delivery of the end product – the nautical chart!

The regular editions of *Lighthouse* have continued to provide an important link and informative tool, not only in Canada but also internationally. We can be very proud of its influence everywhere in the hydrographic world. Long may it continue.

Additionally, the CHA is involved in hydrographic development assistance programs overseas and has established a Student Awards Program, funded largely through management fees for administering these development programs. A great deal of credit is due to Barry Lusk, who was CHA National President from 1987 to 1990.

Another CHA initiative is the Heritage Launch Project in Central Region, which has really promoted the profession of hydrographic surveying and charting among the ship and boat enthusiasts of the Great lakes.

Finally, our luncheon meetings and seminars continue to underline our aims and objectives. I quote:

The Canadian Hydographic Association 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;

The CHA 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 Hydrographic Society.

This does outline our purpose but perhaps should be rewritten with fire in the belly and descriptive rhetoric that challenges the imagination!

To all those who have worked hard to make the CHA an organization to be proud of – Many Happy 30th Birthday Returns.

About the Author...

Mr. T.D.W. McCulloch is an Hydrographic Consultant with McCulloch Hydrographic Consulting and is the project manager for the CHA/CIDA Malaysia Hydrographic Training Project. He is a founding member of the Canadian Hydrographic Association and is a Life Member with Central Branch, CHA. He is also a member of the Canadian Institute of Geomatics, the Hydrographic Society, and the Company of Master Mariners of Canada. Mr McCulloch has expertise in hydrographic surveying and in the direction and management of hydrographic/oceanographic organizations with the government of Canada.

The Canadian Hydrographic Association Award
Letter From 2008 Recipient - Jason Workman

Dear Editor of Lighthouse,

I am extremely excited to be the recipient of the 2008 Canadian Hydrographic Association Award and medallion. It is an honor to have been chosen by the selection committee for such a prestigious award. During my upcoming year of university it will be of great assistance with tuition and book expenses. Thanks to your generosity I am able to continue my education in a path that I love.

Growing up in the small town of Westlock, Alberta I have developed an interest in the outdoors. Therefore, when the career decision for the rest of my life had to be made in high school, Geomatics Engineering was an obvious choice and therefore I planned to proceed in the surveying direction. This fall I will be starting my final year of Geomatics Engineering at the University of Calgary. During university I have had several opportunities to apply my knowledge in this field. I have been a dedicated volunteer with the University of Calgary Solar Car Team for the past two years. I worked to develop specialized software for route navigation as well as utilizing my positioning knowledge to link energy consumption and vehicle movements for car optimization. I have also had the opportunity to work at a small surveying firm to gain further experience in the field of geomatics and I have thoroughly enjoyed it.

Following my graduation I intend to return to the same surveying firm to begin articling for an Alberta Land Surveyor. I am currently preparing to write the Canada Land Surveyor exams this coming year and I hope to become an involved member with your organization.

Thank you so much for your support. It is greatly appreciated.

Sincerely,
Jason Workman

CHA Award Plaque

CHA Award Individual Receipient Medal

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See the Corporate Members section for additional benefits.
Contact *Lighthouse* at the address listed in this journal or at www.hydrography.ca

We invite your organization to become a corporate member in our association. Consider the following benefits:

- ***Receive three copies of each issue of Lighthouse (published twice annually).***
- ***An invitation to participate in CHA seminars.***
- ***Listing and recognition in every edition of Lighthouse.***
- ***An annual 250 word description of your organization in Lighthouse.***
- ***10% off advertising rates in Lighthouse.***
- ***10% off exhibitor fees at CHA sponsored events.***
- ***Listing and link to your home page on each CHA Branch Web site.***
- ***News from corporate members in every edition of Lighthouse.***

The CHA, through *Lighthouse*, is active in promoting the strength and diversity of organizations and companies that support the hydrographic and related communities. Get onboard with us as a corporate member and we will help you reach potential customers throughout our worldwide distribution.

To join, please contact one of the Directors as listed on page 2. International applicants please remit to Central Branch. To obtain an application visit us at *www.hydrography.ca*

Annual dues for CHA Corporate Membership is $150.00 (CDN).

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ASI Group provides a complete range of hydrographic, geophysical and visual inspection techniques to conduct underwater investigations. Lake bottom surface features and targets are located, measured and mapped with precision accuracy in real-time using a combination of geophysical mapping and charting tools. In-house cartographers and graphic specialists interpret geophysical data to produce quality technical reports in hardcopy and GIS compatible formats.

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Association of Canada Lands Surveyors
Association des Arpenteurs des Terres du Canada

The ACLS is a national self-regulating professional association. It has 560 members located across Canada (and the world), who have expertise in surveying, photogrammetry, remote sensing, geodesy, hydrography and land information systems.

The ACLS is committed to raising awareness of the responsibilities and concerns of respective stakeholders in offshore Canada lands, and to find a common strategy to move this industry sector forward for the betterment of all. The following is a short list of the current main thrusts:

- Promotion of a Marine Cadastre for Canada
- Promotion of the ACLS national certification program for hydrographers
- Publication and promotion of the new book entitled "Canada's Offshore: Jurisdiction, Rights, and Management". Copies can be purchased from: www.acls-aatc.ca or www.trafford.com

L'A.A.T.C. est une association professionnelle de juridiction fédérale. Elle est composée de 560 membres répartis aux quatre coins du Canada (et du monde) qui ont une expertise en arpentage, en photogrammétrie, en télédétection, en géodésie, en hydrographie et en systèmes d'information foncière à référence spatiale.

L'A.A.T.C. est engagée à l'amélioration de la sensibilisation aux responsabilités et aux préoccupations des intervenants respectifs des terres extracôtières du Canada et de l'adoption d'une stratégie commune pour faire progresser ce secteur de l'industrie en vue de la plus-value pour tous. Voici la liste des activités principales en cours :

- Promotion d'un cadastre marin pour le Canada.
- Promotion du programme national de certification des hydrographes de l'AATC.
- La publication et la promotion du nouveau livre : *Zone extracôtière canadienne : juridiction, droits et gestion*. La version française sera disponible en novembre 2007. Vous pouvez faire l'acquisition de copies en visitant : www.acls-aatc.ca ou www.trafford.com

For further information please contact:

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C & C Technologies

C & C Technologies (C & C), an international hydrographic surveying company, headquartered in Lafayette, Louisiana, has approximately 400 employees and seven offices worldwide.

As of January 2003, eighty percent of C & C's revenues were derived from survey work for the oil and gas industry and the other twenty percent are derived from US government contracts. The oil industry work includes high-resolution marine geophysics for hazard studies and pipeline route surveys, rig and barge positioning, acoustic positioning for ROVs, as well as satellite navigation services. The company has separate offshore oil industry survey departments for geophysical work, marine construction, and navigation.

C & C Technologies has performed hydrographic survey work for various Government groups including NOAA, the US Geological Survey, and the Corps of Engineers. In 1994, C & C was contracted by the U.S. Naval Research Labs to perform research and development work on semi-submersible autonomous underwater vehicles (AUV's) for hydrographic surveying purposes. In January 2000, C & C and Kongsberg Simrad began working on C & C's new commercial AUV rated for water depths up to 4500 meters. The AUV's sensor payload included multibeam swath high resolution bathymetry and imagery, chirp side-scan sonar and sub-bottom profiler, differential GPS integrated with acoustic / inertial navigation and acoustic communications. Since delivery in January 2001, C & C's AUV has completed over 100,000 kilometres of survey lines for a variety of worldwide clients.

Additional services offered by C & C include: C-Nav™, the highest accuracy worldwide Gc-GPS differential correction service available, in-house state-of-the-art soil analysis lab, and 3 D hazard assessment reporting for MMS deep water site clearances.

For more information regarding C & C Technologies services please contact:

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at (337) 261-0660 email to info@cctechnol.com or
visit C & C's Website at *www.cctechnol.com*

Canadian Seabed Research Ltd

Canadian Seabed Research Ltd. (CSR) is an established company of geophysicists, hydrographic surveyors, and geologists. We operate worldwide, conducting hydrographic and geophysical surveys for a wide range of applications including charting, offshore petroleum, port engineering and marine environmental applications.

Our team of professionals provide a complete marine survey solution that includes positioning, hydrographic surveying, seafloor imaging, subbottom profiling, geotechnical analysis, comprehensive reporting and mapping.

Established in 1985, CSR has developed a solid reputation for achieving the highest quality results. This is based on careful project planning, the use of innovative equipment, and the unique experience our professional team brings to project interpretation and reporting.

CSR's suite of geophysical systems enable us to offer a wide variety of services to our clients. Our multiple profiling systems are used to accurately map depth to bedrock and surficial sediments. Sidescan sonar technology allows us to achieve high resolution seabed imagery for geohazard detection. Our single and multibeam surveys achieve the highest quality bathymetric data for hydrographic and engineering applications.

CSR has conducted surveys throughout Canada and the United States, Beaufort Sea, Russia, South America, North Sea and the High Arctic. Our survey solutions are innovative and based on a thorough understanding of marine geologic and geophysical principles.

Our future will continue to be based on excellence and creative innovation in the earth sciences.

For further information please contact:

Canadian Seabed Research Ltd
Tel: (902) 827-4200 FAX: (902) 827-2002 E-mail: info@csr-marine.com
Website: *www.csr-marine.com*

Fugro Jacques GeoSurveys Inc.

Fugro Jacques GeoSurveys Inc. (FJGI) is a Canadian established company owned by Fugro NV and the Jacques Whitford Group. FJGI has offices in St. John's NL and in Dartmouth, NS and has one the largest private sector suites of hydrographic, geophysical, geotechnical and positioning equipment in Canada. With approximately 85 employees, FJGI has established an impressive track record in Canada and on the international stage.

FJGI has provided seabed mapping and construction support services for all of Eastern Canada's offshore oil and gas developments and is also actively involved in marine based non-oil and gas projects such as Canada's UNCLOS mapping, hydrographic charting in Canada's North, large area habitat mapping, pipeline and cable route surveys, ice scour studies, wharf investigations and a broad range of engineering and construction support surveys.

FJGI's Hydrographic Group operates a wide range of multibeam systems such as Reson 8101, 8111 and 8125 systems. These systems are routinely mobilized by FJGI on ocean going vessels, as well as our customized 26 foot inshore survey launch. Systems have also been mobilized on ROVs for detailed infield mapping.

Multibeam data are processed in the field and at base in St. John's and Dartmouth using CARIS HIPS/SIPS, IVS' Fledermaus visualization tools, and Fugro's own Starfix software suite. The resultant multibeam data are commonly integrated with seabed sampling, underwater imagery, geotechnical, seismic, sidescan and sub-bottom profiler data to deliver superior data products for use in seafloor and sub-seafloor assessments.

Throughout each project, FJGI is committed to the health and safety of its employees, partners and clients, and to the protection of the environment. This is accomplished through the Company's comprehensive HSE policy and Safety Management System which is OHSAS 18001 certified.

If you would like to receive further information about Fugro Jaques GeoSurveys Inc. please contact:

Fugro Jacques GeoSurveys Inc.
Tel: (709) 726-4252 FAX: (709) 726-5007 E-mail: toddralph@fjg.ca
Website: *www.fugro.com*

Interactive Visualization Systems (IVS 3D)

Interactive Visualization Systems (IVS 3D) with its world class, scientific 3D visualization and analysis software, Fledermaus, provides innovative, interactive and client-driven solutions and knowledge for surveying, mapping and research. Fledermaus presents intuitive insight into massive geographic data sets of numerous data types promoting professional interaction and collaboration.

Fledermaus has been developed to allow our clients to explore, analyze, manipulate and gain knowledge from their data by representing very large complex information in the best possible way - in an intuitive fashion - in the way that we perceive the real world everyday. This virtual reality allows new insight to be rapidly gained and more information to be extracted from the underlying data. This results in Fledermaus providing our clients with added value in efficiency, accuracy, completeness, integration, and communication.

IVS 3D has a dynamic and creative team of professionals that are committed to advancing visualization technology; and dedicated to unveiling opportunities to develop and improve visualization and interpretation software in ways that will provide our clients with first-rate software tools to ensure success of their business or research endeavours.

IVS 3D is headquartered in Fredericton, New Brunswick, Canada with an office in Portsmouth, New Hampshire. Both offices provide full support, worldwide in association with a number of alliance partners.

If you would like to receive further information about IVS 3D and its services please contact:

Interactive Visualization Systems (IVS 3D)
Tel: (603) 431-1773 FAX: (603) 766-0485 E-mail: info@ivs3d.com
Website: *www.ivs3d.com*

Jeppesen Norway AS

Through Jeppesen's aviation heritage, the company has over 70 years of valuable experience working with complex data, enhancing, assembling and packaging that data to meet the needs of its customers. Jeppesen has long believed in the value and importance of strategic partnerships with industry groups and source providers, and we carry those beliefs forward with us into the marine industry.

Based upon Jeppesen Marine's relationships with hydrographic offices around the world, we share a common goal of providing superior data solutions to mariners, whether they are on the high seas, coastal or inland waterways. Jeppesen Marine also shares a common bond in improving waterway safety, increasing customer efficiency, and ensuring environmental protection.

Coupled with the acquisition of C-Map and HydroService AS, Jeppesen Marine utilizes a range of data types including vector and raster navigation charts and other digital products. By applying advanced technologies, Jeppesen Marine increases the usefulness, availability and timeliness of hydrographic data, tightly packaging that information into systems and tools that anticipate and meet customer needs.

Customers count on Jeppesen Marine to provide them with the most innovative, reliable navigational tools and data solutions for their commercial or maritime needs. Services include: Cartography services, dKart office tools and services, CM-93 data services and OEM toolkits, CM-ENC toolkit, and 24/7 customer support.

Jeppesen Marine values the unique contributions of hydrographic offices and other data providers and looks forward to continuing to build strategic alliances in the spirit of working together to advance the interests and welfare of mariners around the world.

For further information please contact:

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Kongsberg Maritime

Kongsberg Maritime, a company in the Kongsberg Group, is a leading supplier of advanced multibeam and single beam echosounders and instrumentation systems.

With its strong application knowledge and trend-setting quality products, Kongsberg Maritime is able to offer unique and complete solutions for ROVs, AUVs, positioning systems and sea bed surveying and mapping.

Kongsberg Maritime has about 980 employees with subsidiaries world wide. Canadian operations include a sales office in Halifax and a factory in Port Coquitlam, British Colombia.The Headquarters are located in Kongsberg, Norway. Kongsberg Maritime exports its products to all of the world's major markets.

For more information regarding Kongsberg Maritime please contact:

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Survey & Underwater Vehicle Instrumentation
Tel: (902) 468-2268 FAX: (902) 468-2217 E-mail: john.gillis@kongsberg.com
or visit Offshore: *www.km.kongsberg.com* and Marine: *www.simrad.no*

NetSurvey Limited

NetSurvey is one of the leading multibeam service solution providers worldwide. We provide a specialist service to survey companies, ports and harbor authorities and research and government organizations. We are at the forefront of multibeam technology, combining the latest equipment and software to give unrivalled results in new and complex areas, such as ROV based surveys, fisheries habitat mapping, detailed wreck investigation and many others.

We can supply any portable multibeam system suitable for vessel, ROV or AUV deployment and all ancillary sensors installed, operated and processed by a team of highly trained multibeam surveyors and engineers. Our specialist personnel are also available to supplement your offshore teams or to act as client representatives.

We offer an in-house data processing service that can range from simple swath bathymetry cleaning to full 3D Visualization and fly-through using Fledermaus software. NetSurvey also offers bespoke training courses with a practical emphasis.

All of our surveyors/engineers are trained-up on Reson, ELAC, Simrad and GeoAcoustics multibeam systems; Applanix, TSS, Kongsberg-Seatex and CODAOctopus motion sensors; QPS, Eiva, CARIS HIPS/SIPS and Fledermaus software.

With our large equipment pool available for hire and some of the most experienced multibeam specialist personnel, NetSurvey can provide you with peace of mind and the complete multibeam solution at a very competitive rate.

If you would like to receive further information about NetSurvey and its services contact Duncan Mallace or visit *www.netsurvey.co.uk*

If you would like to receive further information about NetSurvey and its services please contact:

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Website: *www.netsurvey.co.uk*

RESON Inc.

Established in 1976, RESON has grown steadily and is now one of the world's leading companies in the field of underwater acoustics and high-power ultrasonics. In addition, RESON is the leading company in the design, manufacture, delivery, and support of integrated multibeam echo sounder systems. RESON also designs and manufactures specialty Transducers, Hydrophones, and complete Sonar Systems.

RESON is an international corporation with offices in Denmark, Scotland, Germany, South Africa, Singapore, the Netherlands, Italy and the United States.

We have assembled a team of highly skilled engineers committed to advanced engineering and to the design of sonar and acoustic systems. In addition, RESON employs a team of more than one hundred professionals dedicated to such disciplines as Program Management, Quality Assurance, Manufacturing, Software Development, Security, and Administration. The resulting corporation, RESON, is renowned for providing innovative solutions to complex underwater surveying and military problems.

To date, RESON has delivered over 700 multibeam systems, more than all our competitors combined.

In summary, RESON is involved in the following application areas:

- Seafloor Mapping and Inspection
- Offshore and Construction
- Acoustic Calibration
- Acoustic Test Range
- Surveillance and Security
- Mine Counter Measures, MCM
- Anti-Submarine Warfare, ASW
- Systems Performance Modeling
- High-Speed Signal Processing Hardware and Software
- Image Processing.

For further information please contact:

RESON Inc.
Tel: (805) 964-6260 FAX: (805) 964-7537 E-mail:sales@reson.com
Website: *www.reson.com*

SANI-INTERNATIONAL TECHNOLOGY ADVISORS INC. (SANI-ITA)

SANI-INTERNATIONAL TECHNOLOGY ADVISORS INC. (SANI-ITA), an Ontario Corporation, provides services and consulting in geographic information systems, remote sensing, softcopy photogrammetry and hydrography. The Corporation is a Distributor for GeoEye (IKONOS and OrbView imagery) Lizardtech (MrSID GeoExpress and DocumentExpress) and Nuvision (softcopy photogrammetry hardware) and is also the Authorised Training Centre in Canada for the complete suite of ERDAS IMAGINE software products running on SUN Solaris (UNIX) and Microsoft Windows platforms. SANI-ITA is a sister company to Spatial Geo-Link Limited, the exclusive distributor in Canada for Leica Geosystems softcopy photogrammetry and geographic imaging products.

SANI-ITA is ISO 9001:2000 registered. ISO 9001:2000 (the most comprehensive of the ISO 9000 series of standards for quality assurance developed by the International Organisation for Standardisation) encompasses all aspects of quality management inclusive of understanding customer requirements, design control and development and consulting services.

Services offered by SANI-ITA include:

- Project Consulting and Project Management
- Airborne and spaceborne data acquisitions
- Control surveys
- Hydrographic surveys
- Aerial triangulation and orthorectification of airborne data (metric, digital or video cameras) and satellite sensors (SPOT, IRS-1C, IKONOS, ASTER, QuickBird, EROS1A, OrbView SPOT5, THEOS1, FORMOSAT2 and Landsat)
- Digital Elevation/Terrain collection – automatic or static mode
- Orthomagery production
- Digital topographic mapping and map and chart revision
- GIS data structuring
- Map conversion and data translation services
- Image compression services (lossy and lossless)
- Third party audits of mapping and image data
- Visualisation services including dynamic fly-throughs and stereoscopic viewing

For additional information on the Corporation, please visit our website at:

www.sani-ita.com
or contact us at
Tel: (905) 943-7774 FAX: (905) 943-7775

IVS3D

Mahoney Internet Marketing

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IVS 3D Continues to Pursue Innovation with the Addition of Chief System Architect
Maurice Doucet Hired as Chief System Architect to the IVS Development Team

Portsmouth, NH, January 2009- IVS 3D has appointed Maurice Doucet to the software development team as the Chief Systems Architect in the Portsmouth, NH office.

With over 20 years of experience in the software industry, Mr. Doucet brings significant experience in commercial product development from consumer applications to real-time sensor control and data visualization. He joins IVS from Triton Imaging where he was the Chief Technology Officer responsible for leading the development of sonar acquisition and processing software.

Mr. Doucet's role will initially focus on a joint project with the Center for Coastal & Ocean Mapping, University of New Hampshire, which is partly funded by a grant from the New Hampshire Innovation Research Center. The project addresses the data extraction, analysis and visualization of water column data from single beam and multibeam sonars. The development from this project will address the requirements of both the hydrographic and fisheries users in the emerging uses of these data.

Lindsay Gee, CEO for IVS 3D, stated "We are delighted to have Maurice onboard, and I have no doubt that his knowledge and experience will strength the already broad expertise of our development team. This will directly benefit our customers by keeping our products at the leading edge of technology."

Interactive Visualization Systems' (IVS3D) was founded in 1995 as the developer of the Fledermaus 3D visualization and analysis software suite. Government, commercial and academic clients in all areas of ocean mapping use the software internationally.

The Fledermaus software stands apart in providing scientists and engineers with interactive and intuitive tools for processing, quality control and analysis of multibeam sonar and related data. Its use significantly improves efficiencies in areas such as; nautical charting, geologic interpretation, the assessment of seabed habitats, planning routes for pipelines and cables, and the identification of geohazards during engineering development.

The company has offices in Canada, USA, and the UK, and a worldwide distribution network. For more information about the company and products, visit www.ivs3d.com.

If you would like more information on this topic, or to schedule an interview, please contact
Carole Mahoney at 207-636-7887 or via email: carole@minternetmarketing.com

IXSEA

OCTANS PROVES SUCCESSFUL ONCE AGAIN


OCTANS gyrocompass and motion sensor proved successful nboard SAM3, Kockums' new SAM3 minesweeping system. Photos: Kockums.

IXSEA has announced the successful use of OCTANS, an IMO certified survey grade gyrocompass and complete motion sensor, onboard Kockums' new SAM3 minesweeping system.

SAM 3 is the most modern and recent development in the field of remote-controlled influence minesweeping. SAM 3 is robust, resistant to underwater explosions and equipped with magnetic, acoustic and electric devices that can generate ship-like signatures.

Kockums conducted successful trials earlier this year with the Dutch, Swedish and Finnish navies, which involved track-keeping in the area outside the naval base in Den Helder, the Netherlands. The area is quite challenging due to the strong current, wind and sea state.

"The excellent OCTANS is based on IXSEA's Fiber Optic Gyroscope (FOG) technology, which outputs true heading, roll, pitch, surge, sway, heave, speed, acceleration and rate of turn," said Maarten Van Beelen, Managing Director, IXSEA bv.

About IXSEA
At IXSEA, we combine smart technology and experience with marine know-how to provide our customers with the most efficient and user-friendly navigation, positioning and seabed mapping systems, software and solutions.
We constantly strive to exceed our customers' expectations with our high-performance technology, our international sales network, installation and round-the-clock customer support.

To sail. To sound. To analyze.

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IXSEA

AT EURONAVAL, IXSEA TAKES ITS PLACE AS KEY PLAYER IN THE DEFENSE INDUSTRY

IXSEA takes its place as a key player in the defense industry at EURONAVAL 2008, to be held at Paris-Le Bourget, France, from 27 to 31 October, with its state-of-the-art Fiber Optic Gyroscope (FOG) technology for naval applications.

Designed to meet the demands of the navy for more accurate INS, MARINS is a state-of-the-art naval inertial navigation system based on the company's solid state FOG technology. Currently the US DoD is investing millions of dollars to develop military grade inertial systems based on FOG technology for its navy. However, IXSEA is already producing systems with this technology, such as MARINS.

Marins INS

Earlier this year, IXSEA delivered several MARINS to the Dutch based company, Imtech Marine & Offshore. These systems, perfect for naval applications, will be used on Ocean Patrol Vessels.

IXSEA provides full route survey systems, consisting of a full suite of sensors (sonars, multibeam echosounder, gradiometer and an acoustic position system) as well as software which allows survey management, display and interpretation of all collected data. Recently, the Belgian Navy commissioned such a portable route survey system to be used on its fleet of mine-hunters.

Gradiomagis

Recently launched, GRADIOMAGIS is a truly omnidirectional gradiometer

designed to map unexploded ordnance or other metallic objects. Its real-time magnetic gradient computation allows for superior spatial resolution and sensitivity to detection features.

SODENA WECDIS PC-based GIS systems are ECDIS compliant and IEC 60945 standard hardware solutions. The company can integrate all standard and non-standard devices into a single system such as waterproof terminals and ruggedized PCs.

About IXSEA
IXSEA has equipped more than 350 naval vessels with OCTANS, PHINS and MARINS Navigation Systems.
The company strives to exceed our customers' expectations with our high-performance technology, our international sales network, installation and round-the-clock customer support.

To sail. To sound. To analyze.

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IXSEA

IXSEA LAUNCHES LAND AND AIR DIVISION AT INTERGEO

IXSEA, the Navigation and Position specialists, is broadening its range with the launch of a Land and Air Division at INTERGEO, which takes place from 30 September to 2 October in Bremen, Germany. The new division delivers georeferencing systems for the airborne and land-based survey industries and inertial navigation solutions for the military market.

"Launching a Land and Air Division is a natural progression for IXSEA," said Yves Paturel, Director of IXSEA's new Land and Air Division. "We have a unique position in this industry since we manufacture our own IMUs and FOG sensors in Europe and have been producing our own gyroscopes for many years. Therefore we can adapt rapidly to the needs of the industry and indeed offer high-performance at a lower cost.
We also can rely on our existing worldwide 24/7 support network to assist our customers from integration to mission."

At INTERGEO, IXSEA launched the generation LANDINS and AIRINS: simple, turnkey position, orientation and direct georeferencing systems. They offer dependable position information in environments where GNSS is limited, even in real-time, thanks to their high-grade inertial hearts designed by IXSEA.

LANDINS, designed for mobile land-based applications combines highly accurate position, precise timing and a very fast output rate to meet the requirements of the most demanding road survey and mapping applications. The system computes high-quality 3-D position and orientation data in real-time, even in difficult environments, such as urban canyons or under canopy, which makes LANDINS an ideal tool for asset management, data collection and road survey applications.

AIRINS is a real-time georeferencing system designed to meet the requirements of the most demanding airborne survey and remote sensing applications such as digital cameras, SAR, digital scanners, films cameras and LIDAR even in real-time, which makes it an ideal system for fast response applications.

About IXSEA
IXSEA's Land and Air Division provides direct georeferencing solutions for air and land based applications.
IXSEA offers high-performance technology, an international sales network, installation and round-the-clock customer support.

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New exclusive RESON representative and technical support in ASEAN region

RESON is pleased to announce the appointment of Sea and Land Technologies PL, as their exclusive representa-tive for the ASEAN region, effective 1st of January 2009.

Sea and Land Technologies PL (SALT) will be responsible for sales, marketing as well as technical support and repairs of SeaBat multibeam sonar systems and NaviSound singlebeam echosounders.

Based in Singapore SALT specializes in the sales, system integration, engineering and support of high tech electronic instrumentation and mechanical equipment for data acquisition & processing equipment. These solutions are used for various applications within environmental surveys, oceanography, hydrographic surveys, Marine seismic surveys, coastal monitoring studies as well as commercial & military diving.

The company operates within the ASEAN region and offers 24/7 technical support from their service centre, which has qualified and factory-trained engineers for equipment repairs, commissioning and installation, operator train-ing, calibration, warranty and maintenance support.

SALT is certified for ISO 9001:2000 by Lloyd's Register Quality Assurance accredited by UKAS.

SALT can be contacted at the following address:

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Singapore 639508
Tel: +65 6518 0777
Fax:+65 6563 0366
E-mail: enquiry@sea-landtech.com.sg
Website: www.sea-landtech.com.sg

Additional information

Contact:	VP Solution Concepts Thomas Meurling, RESON Inc., USA
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About RESON

RESON is a market leader in underwater acoustic sensors, state-of-the-art echosounders, multibeam sonar systems, transducers, hydrophones, and PDS200 software. RESON's SeaBat® sonars and NaviSound® echosounder systems have become an industrial standard in areas such as hydrography, dredging and offshore operations as well as within defense and security applications.

Thanks to continued product and technology development, RESON leads its technological field. The company is growing and expanding into new markets and application areas – and its fourth generation of sonar systems will provide unprecedented performance for naval and commercial sys-tems in terms of accuracy, resolution, depth rating, and range. RESON has its corporate headquarters in Denmark, with subsidiaries in the U.K., the U.S., the Netherlands, Germany and Singapore.

O'CONNER, Anthony (Tony)

O'CONNOR, Anthony (Tony) It is with great sadness that we announce the sudden passing of Anthony (Tony) O'Connor on Wednesday September 24, 2008 at the age of 67. Tony was born in Dublin, Ireland, raised in Seaham Harbour, England and immigrated to Canada in 1967, a country he loved so very much. Tony's career extended from the British Merchant Navy to Dominion Hydrographer of Canada, Canadian Hydrographic Service, and he spent many happy years at sea on the "Willie J". Tony loved the North and explored it when he was Hydrographer-in-Charge & Chief Scientist on board C.S.S. Hudson for the major cruise to the Beaufort Sea and Northwest Passage. He was a loving husband and father, a valued friend and touched the lives of many. Lovingly remembered by his devoted wife Sandra, missed deeply by daughters Kelly and Claire (Lawrence), and son Neil. Pre-deceased by sisters Maureen, Valerie and Susan, survived by brother Kevin. He will be sadly missed by many relatives and friends across the country. Memorial celebration will be held at the Fairmont Chateau Laurier, Drawing Room (1 Rideau St., Ottawa) on Tuesday September 30, 2008. Visitation at 11:30a.m., and celebration of his life at noon with refreshments following. In lieu of flowers, a contribution may be made to the MS Society of Canada, or the charity of your choice.

From the Ottawa Citizen

CAMERON, Ralph Murray

CAMERON, Ralph Murray 86, Dartmouth, passed away peacefully at home early Friday morning, January 23, 2009. Born in Springhill, he was the son of the late Herbert and Elizabeth (Harvey) Cameron. Ralph is survived by his loving wife of over 50 years, Maria (DeLaude) Cameron. Raised in Springhill, Ralph started his career as a coal miner. He served during the Second World War with the North Nova Scotia Highlanders and also served with the R.C.A.F. 113th Bomber Reconnaissance Squadron. As a radio/wireless operator, gunner and pilot. Ralph was engaged in anti-submarine warfare during the Battle of the Gulf of St. Lawrence and convoy escort missions in the North Atlantic. Later, he was transferred to Bomber Command in Europe where he continued convoy escorting and anti-submarine warfare. During D-Day, he flew photo-intelligence missions over Normandy and other missions in Europe until the end of the war. After the Second World War, Ralph attended Mt. Allison University and later was hired by the Canadian Hydrographic Service. Working out of the Bedford Institute of Oceanography, Ralph worked for 35 years charting Canadian waters. He served as Chief Hydrographer of the H.M.C.S. Acadia. Ralph retired from the Canadian Hydrographic Service in 1984. He had a passion for astronomy and loved spending time in the outdoors at his cottage. He is survived by his stepson, Paul Zahoric; children, Heather (Hemphill), Debbie, Gordon, Beth (Drummand), Robert, Anna (Johnson), and Scott; stepgrandchildren, Jeffrey and Christopher; grandchildren, Matthew, Nattalie, Marlee, Rosie, and Mariah; great-grandchildren, Brodie, and Aiden; several nieces and nephews.

From the Chronicle Herald

CENTRAL REGION

Data Acquisition Report - June-September 2008

Revisory Survey

Revisory survey started the season in Lake Ontario with surveys in Port Credit, Oakville, Clarkson, Oshawa and Whitby. Single beam soundings and back pack data were collected at two marinas in Port Credit (Chart 2048), the Port Credit Yacht Club and the Lakefront Promenade Marina (Chart 2086) and Clarkson (Chart 2047) Floating aids in Oakville Harbour were positioned by launch and described. Single beam, multibeam and back pack data was also collected at Clarkson. Revisory then moved to Georgian Bay working out of Britt, then Sudbury and finally Killarney completing general revisory and shoreline investigation for Charts 2204 and 2205. Outstanding line work was run for incomplete field sheet 120059 (Georgian Bay) and the most significant shoals were examined. Revisory then moved to Oshawa/Whitby (Chart 2049) where an almost complete resurvey of the harbour and area was done (some data was already collected in 2005). Some items were investigated in Oshawa Harbour, (Chart 2050), Port Hope (Chart 2053) and the Scugog River near Lindsay (Chart 2026). There was no resolution on the latter two as there was not enough water to launch a boat near Lindsay (for a pipe outfall) and the intake in Port Hope has not yet been installed. This work should be completed by the 2009 navigation season. After finishing up in Whitby, the survey returned to Lakefront Promenade Marina and Port Credit Yacht Club to complete work that was begun in May 2008. The survey was done with the intent of creating a harbour chart or inset for this area at 1:5,000. The best current representation is at 1:50,000 on Chart 2086.

Arctic Surveys

The *CCGS Louis S. St-Laurent* was commissioned for UNCLOS and a 6 week cruise in the Beaufort which was a continuation of the work from the Summer 2007. In collaboration with the US, the *USCGC Healy* escorted the *CCGS Louis S. St-Laurent* for seismic work. For the lines where hydrography is important the escort role was reversed as the *USCGC Healy* is outfitted with multibeam. Over 5500km of soundings with seismic work were collected.

The *CCGS Nahidik* Western Arctic Survey was the continuation of joint CHS and NRCan seabed mapping project. The data collected during the project will provide the baseline information for future research and decision making relating to hydrocarbon development in the Beaufort Sea; while enhancing the nautical charts of the area. The program involved the collection of multibeam, single-beam and side scan sonar data from a survey launch and the *Nahidik*, as well as other sampling techniques. The multibeam launch *Petrel* supported seabed mapping and singlebeam launch *Widgeon* supported the collection of watercolumn data during the first science leg.

The *CCGS Sir Wilfrid Laurier* served as a platform for opportunity-based surveys in the Western Arctic, Queen Maud Gulf area. The program was to resume hydrographic surveys conducted in 1999 and 2000 and included a wharf survey at Kugluktuk, an alternate corridor survey for safe passage south of Hat Island, surveys of fixed aids and other opportunities to collect bathymetry in uncharted areas. The program involved a partnership with Parks Canada Agency's Underwater Archaeological Service where CHS provided logistical and hydrographic support for the search for the Franklin ships - *HMS Erebus* and *Terror* and the UAS provided side scan sonar support for hydrography. Singlebeam launchs *Cormorant* and *Wood* served as side scan platforms. While Coast Guard supported this survey as an opportunity-based program subject to ice escort, and Search and Rescue, CHS worked closely with Coast Guard's navigational aids maintenance program to re-position a number of beacons as they underwent reconstruction. Our main purpose remains updating and charting for safe navigation in the north.

The *CCGS Henry Larsen* was another Opportunity-based survey and we designed an aggressive program which proved to be very fruitful. It was in cooperation with UNB and we had the multibeam survey launch *Heron* onboard and staffed with UNB people. The objectives were to collect large scale "community-based" hydrography for Nanisivik and Arctic Bay. We also addressed oceanography concerns to improve bathymetry coverage in Admiralty Inlet for Charles Hannah's modelling. UNB staff also collected science data in Pond Inlet and some glacier areas. While CCG was doing crew change in Resolute, some additional hydrography was collected in Resolute Bay. This survey began Aug 7.

Aboard *CCGS Amundsen*, collaboration with ArcticNet ensures that UNB continues to collect multibeam track soundings during the 2008 season. They will prepare the metadata files for various legs or geographic areas of the cruise and we will make submissions to CHSDir as source.

Nautical Publications Division Report June-September 2008

The period from June to September is generally a slow period in the office for chart/ENC production mainly because this is when many of our MDH staff participate in hydrographic field surveys in either southern or northern Canada. This year has been no exception.

Despite this, our publications division has been successful in maintaining our efforts in publishing critical information through our Notices to Mariners for paper charts, S57 ENCs and Sailing Directions and in making modest progress on our new production projects.

The work on a new edition of sailing directions for *ARC400, Arctic Canada I*, was completed in June and sent to Ottawa for translation, printing and publishing. In addition, the project to produce a new edition for sailing directions volume CEN301, *St. Lawrence River, Montreal to Kingston* began and is progressing on schedule with a planned completion date in February 2009. These volumes will be using the new Print-On-Demand format for sailing directions publications which will increase the efficiency of keeping these products up-to-date and eventually facilitate access by mariners. Work on new editions of several harbours in Lake Ontario has begun with the initiation of two new chart formats for Lake Ontario West and Lake Ontario East. In addition, the entire suite of 37 charts in the Mackenzie River are being brought onto NAD83 using raster editing tools and are scheduled to be available by the spring of 2009.

Implementation of the Hydrographic Production Database (HPD) in the region for our chart/ENC production seems to accelerate and stall simultaneously! The more we try to adopt the capabilities inherent in this software across a broad range of our products the more barriers we encounter when trying to advance the products to meet the schedules that have been developed. This is primarily because HPD requires common vertical and horizontal datums and metric sounding units/contours when charts overlap within the same scale usage. The consequence

to this fact compels the harmonization of all overlapping charts within that scale usage in order to work on any single product within that cluster of charts. This has meant that we are frequently faced with recompiling overlapping charts which are off datum vertically and/or use imperial depth units and contours before being able to focus on the chart that needs publishing.

It has been estimated that to complete the harmonization of selected charts in southern waters that are suited for HPD production (i.e. paper chart and ENC equivalents) will require nearly 80 person years of effort because many of these charts will require recompilation! There is hope that special funding will be available to assist in this work.

PACIFIC REGION

CHS Pacific Region, Data Acquisition and Technical Support Division October 10, 2008

The 2008 field season is drawing to a close. The *Otter Bay* c/w EM3002, Teledyne-Benthos C3D and MVP-30 is now working in the San Juan Islands. After Thanksgiving, it will move to False Creek for surveys in support of the 2010 Olympic Games security. It was a very successful season for the vessel and hydrographers aboard, traversing the coast of BC from Pedder Bay to the Queen Charlotte Islands, annual surveys of Sandheads and Squamish, more surveys in the Gulf Islands including Active Passage, Broughton Archipelago clam gardens, harbour surveys to support the Kitimat Gateway charting initiative, Gwaii Haanas NMCA and several reported hazard investigations. The *Otter Bay* was also used for a few days of C3D training at IOS.

The *Vector*/EM1002A worked for about 12 weeks in Coastal inlets, Johnstone Strait, Queen Charlotte Strait, Kitimat Gateway approaches to support new charting, Pearse and Portland Canals to support transboundary ENC production, Learmonth Bank to assess sponge reefs for NRCAN and the Alaska State Department of Fish and Wildlife, Gwaii Haanas NMCA for Parks Canada and Browns Passage in support of Environment Canada's disposal at sea program. Exceptionally good weather in Hecate Strait allowed coverage on the very rugged west coast of Aristazabal Island; good weather also allowed more coverage on the west coast of the Queen Charlotte Islands.

This year, CHS hydrographers tagged along on other program cruises, collecting additional multibeam coverage whenever the *Vector* had idle time from the other program. This allowed CHS to collect detailed bathymetry and acoustic backscatter in areas we may not normally go. It also makes more effective use of the *Vector* as a Science asset and data collection platform, instead of just a floating hotel. Areas included: Quatsino Sound; Fitzhugh Sound; Seaforth Channel; Gardner Canal; Douglas Channel and several other areas. The *Vector* is now on the central BC coast, where additional coverage is expected in several areas that will support Inside Passage charting and the Kitimat Gateway initiative. There are 2 additional weeks of work planned in southern waters in February 2008, provided the EM710 is operational after the dry docking (see below).

The fast response craft *Shoal Seeker*, now fully outfitted for hazard investigations, was used to investigate and document changes in the approaches to Masset and Naden Harbours. In the coming year, she will be upgraded to conduct full bottom coverage surveys by integrating the C3D presently in use on the *Otter Bay*.

Meanwhile, our tidal group has been very busy making much needed upgrades to several of the Permanent Water Level Network (PWLN) and Emergency Response (tsunami) gauges. A tidal gauge and Doppler current meter were installed in Masset to support the field surveys, and to improve our tide and current predictions for the area. Fred Stephenson retired this past February, but continues as an emeritus scientist dealing with Pacific tsunami response issues. Denny Sinnott is learning the ropes as our new Supervisor of Tides and Currents. Ron Woolley has moved from Surveys to the tidal group to assist with gauge renewal and diving support so that Denny can focus on more strategic issues.

Hydrographic Systems support assisted with mobilization and demobilization of all surveys, and provided on-board technical support and data processing during *Vector* survey operations. They have also been actively involved in the technical support of the tidal network rebuild. We welcome John Caruana and Jake Ferrier, our new electronics technologists, who come to us from CCG and from Environment Canada respectively. John has been supporting our tidal network under Al Thomson's mentorship; Jake spent two weeks on the *Vector* this summer in Gwaii Haanas NMCA, learning the multibeam system under the mentorship of Gordon Worthing.

Computer Support has been busy supporting the office network and CARIS desktop for CHS, developing and maintaining software applications, production of tide and current table predictions and supporting shipboard networks and software aboard vessels. We welcome Mike Sheward, our new programmer/analyst, who has come to us from DND.

Sonar Systems Group has been working on seabed classification of multibeam data the northern Strait of Georgia chart. The *Otter Bay* spent two weeks in the field collecting bottom samples and video for ground truth of the acoustics seabed classification results. In the coming year, seabed classification will be integrated with regular bathymetry surveys using multibeam and bathymetric sidescan systems. GeoCoder, classification software developed at University of New Hampshire, has been incorporated in Hypack and will be a part of the CARIS HIPS/SIPS suite of tools at the next release. CHS Pacific continues to support development of the QTC classification toolbox.

Another big project for SSG this year is the installation/upgrade of the EM1002A on board the *CCGS Vector* to a 0.5° x 1.0° EM710 chirp multibeam. Preliminary design work is now complete and approval received from CCG to proceed with a gondola installation, based on the successful (acoustically quiet) NAVOCEANO TAGS-60 class design. The vessel will spend 7 weeks in drydock to remove the old system, reinforce the hull and attach the newly-built gondola. In addition to the EM710, a 3x3 sub-bottom profiler array, pan-tiltable underwater cameras and other science transducers and hydrophones will be installed. John Hughes Clarke will be out in April 2009 to assist with sea acceptance trials.

The Manager, meanwhile, has been preparing materials for the upcoming Data Acquisition course in Sidney and Mont Joli this fall and working to complete several staffing processes. Brad Strong and Rosanne Sheppard will be the Pacific Region participants on the 2008 version of the DA course.

Pacific Region said goodbye to two hydrographers: 1 new and 1 experienced. Mike McMahon had only recently joined the Data Acquisition group after spending a year in Navigational Products and Services. He is now working in HDC for Atlantic Region at BIO. David Thornhill, who worked for us for nearly 2 decades, has returned to the rock. He starts work for our Newfoundland district office at the end of October.

Navigational Products and Services Update October 2008

The Navigational Products and Services division is in the process of completing a number of new charts and new editions as we enter the second half of the fiscal year. The prime focus for the division is completion of the new edition of the Gulf Islands Cruising Atlas, chart 3313. Selling about 1000 copies a year at $89 each, this is a major revenue generator for the CHS. This product will incorporate many suggestion received from user feedback, such as a new, easier to use NAD 83 border, updated chart pages, new information pages and updated sailing direction with photographs.

The other major push for the division is the continual production of a new series of charts in the approaches to Kitimat. To date 5 new charts and ENCs have been released, with one more to come this year and an anticipated 5 more in 2009. This will go a long way to replacing the old imperial charts remaining on that part of the coast. These will also incorporate new multibeam surveys.

A new version of the Pacific Coast Catalogue is in production which we hope to see released for the boat show season in early 2009.

Recently two long term employees retired from our division. Dave Fisher retired after 33 years of service, most recently as the Client Liaison Officer. Graham Whincup also retired after 30 years service as a multi disciplinary hydrographer. Both will be deeply missed for their hard work and wealth of experience.

NATIONAL

The CHA National President George McFarlane presenting the Dominion Hydrographer Dr. Savi Narayanan with her CHA Membership Pin in Ottawa, Friday October 24, 2008.

National AGM Minutes

The minutes of the Canadian Hydrographic Association 2008 National Annual General Meeting that took place in the Sidney Room, Victoria Cobference Centre, Victoria BC, Wednesday May 7th, 2008, may be found on the CHA website at www.hydrography.ca.

PACIFIC BRANCH

Congratulations to the CHC-NSC2008 organizing committee for putting together a great conference. I believe many of us are still recovering from the hang over. We congratulate Erin Caskey, from Applied Microsystems, for winning the CHA draw contest. Erin won a hand held GPS. Although the conference has passed the work still continues with the final wrap up. We here at Pacific branch would like to congratulate the committee members who spent many hours working on this conference. We would also like to thank the many volunteers from the branch that came out to help out at the conference. We would like to thank Brian Port, Craig Lessels, Tracey Prentice, Rob Hare, and George Schlagintweit for serving on the committee. We would also like to thank Ken Halcro, Carol Nowak, Willie Rapatz, Alex Raymond, Fred Stephenson, and Art Lyon for volunteering there time to work at the conference and to staff the CHA booth.

We celebrated World Hydrography Day with a luncheon at Dunsmuir Lodge. This luncheon served 2 purposes. The first was to thank all the Pacific Region CHS and CHA members for their hep at the conference. The second was to celebrate World Hydrography Day. We congratulate Gordon Worthing for winning the hand held GPS that was given away as the door prize.

After the conference it was off to the field for a busy summer of field work here in pacific region. We had many members away for most of the summer, which lead to a quiet summer for the branch. As we return here in the fall we are looking forward to several events.

The first event will be a lunch time presentation from CHA Pacific member Alex Raymond on the effects of Lyme Disease. That will be followed by a Farewell to the Pender party. The Pender was a Pacific Region barge used to support hydrographic surveys for many years. She is being disposed of this year and the branch will be holding a wake, in the form of a wine and cheese, with a slide show to say goodbye.

The next event, in December, will be the AGM. We ask that all members come out and participate at the AGM.

We would also like to wish new CHA member Lynn Collier well on the east coast as she transferred from CHA Pacific to CHS Atlantic region. We will see her back out west for the Data Acquisition course.

CENTRAL BRANCH

Member News

Members were involved in various CHS surveys and activities during the past survey season.

Terese Herron and Carol Robinson of Tides and Water Levels performed Maintenance on Tide gauges through Central and Arctic's Region. Terese was also involved in a Tide and Current survey in Pangirtung in the Eastern Arctic.

Tim Janzen was Hydrographer in charge (HIC) on Revisory survey and was also HIC of the Eastern Arctic survey on the *CCGS Louis St. Laurent*. Tim was assisted by Jason Bartlett.

Jon Biggar, HIC aboard *CCGS Louis St. Laurent* was assisted by Fred Oliff and Donald Kalley.

Andrew Leyzack, HIC on the *CCGS Sir Wilfrid Laurier* was assisted by Roger Cameron.

Scott Youngblut served as Acting HIC aboard *CCGS Nahidik* and was assisted by Jim Weedon and Christine Delbridge.

World Hydrography Day

Central Branch commemorated the third World Hydrography Day with an exhibit at Spencer Smith Park in Burlington on Saturday June 21st. CHA Members Fred Oliff, Jeff Walker, Christine Delbridge, and Roger Cameron manned the exhibit.

The exhibit featured *Surveyor*, a replica of a C.1790 British Admiralty Launch, along with a separate display under a canopy. *Surveyor*, with Jeff in period costume, served well as a crowd magnet. On display under the canopy was a World Hydrography Day poster featuring Crests of the CHS, IHO and CHA, along with CHA materials. Featured prominently in the display was the Hamilton Harbour poster produced by the Canadian Hydrographic Service featuring multibeam imagery of the harbour. It was popular with the public and attracted many people into the exhibit. Also on display was the *Surveyor* poster, Friends of Hydrography poster and the Student Award poster. Copies of *Lighthouse*, the CHA Pamphlet, Membership and *Lighthouse* subscription forms were made available to the public. Due to public interest, the exhibit was extend beyond the scheduled 5:00 p.m. closing. Of special note, CHS director Dale Nicholson stopped by to view the exhibit and stayed for the better part of an hour.

Special thanks go out to Paola Travaglini for supplying a laminated copy of the Hamilton Harbour poster for the occasion as well for her work in updating the CHA pamphlet, and both the membership and *Lighthouse* subscription forms. Special thanks also go out to Heimo Duller, Julia Duller, Elizabeth Sinclair and Carol Robinson for their assistance with the exhibit. Thanks once again to all who contributed to making this third World Hydrography Day a memorable one.

Summer BBQ

On July 5 the CHA Central Branch held its annual barbeque, graciously hosted by Jim Weedon at his home in Beamsville. Jim's backyard oasis was the perfect venue for the event and the weather could not have been better. Great food, great company, no shortage of cold beverages, and a healthy dose of Vitamin D made for a wonderful afternoon enjoyed by all who attended.

While this was predominantly a social event, several items of business were addressed. Roger Cameron was officially acclaimed as the new Vice President of Central Branch while Christine Delbridge was acclaimed in Roger's previous position as Secretary. National CHA President George McFarlane thanked outgoing Central Branch VP Fred Oliff for his hard work and commitment over the past 3.5 years in which he commanded the post. George presented Fred with a gift – a supply of authentic Jamaican coffee beans which I'm sure will be enjoyed by Fred as well as his co-workers (hint, hint :).

Thanks to all those who pitched in the planning, execution and clean-up, particularly to Paola Travaglini who set a new standard in backyard BBQ cuisine which will be tough to beat. Thanks again to Jim Weedon for hosting, to Jeff Walker for organizing, and to Roger Cameron and Fred Oliff for all their help in pulling off this great event.

Admiralty Launch Surveyor

After two years of sitting idle and following restoration and refurbishing, *Surveyor* touched water once again.

On the July 18-20th weekend at Discovery Harbour, Penetanguishene *Surveyor* participated in the School of the Sailor. The historical site of Discovery Harbour, home to Admiral Bayfield during his years surveying Georgian Bay has been a significant location for the crew of *Surveyor* and brought back many memories. The crew arrived Friday night and after launching *Surveyor* she was then rowed to the historical docks of Discovery Harbour, joining up with a flotilla of other small craft. *Surveyor's* crew for the weekend included Earl Brown, Fred Oliff, Ken Dexel, Brian Power, Heimo Duller, Gill Bibby and two new recruits from Quebec Branch, Bernard Lebreque and Robert Dorais.

Organizers of the School of the Sailor prepared a full agenda of activities for *Surveyor*. These ranged from on the water rowing demonstrations to cutlass drills and classroom presentations on early navigation and hydrography. During the weekend closing ceremonies,

Robert Dorais a hydrographer with the CHS Institut Maurice-Lamontagne presented the event organizers with a ceremonial chart showing the voyages and exploration of Samuel de Champlain between the years 1567 – 1635. Robert drew attention to the fact that Champlain's exploration had included traveling to Penetanguishene.

This summer Quebec City celebrated its 400-year Anniversary. Robert and Bernard specifically made the trip to Discovery Harbour to pick up the launch and transport her to Quebec City. For two weeks in July and August *Surveyor* was on public display in the harbour. Crewed by CHS staff from Quebec Region, they conducted daily on the water demonstrations of early hydrography while dressed in period clothing.

ATLANTIC BRANCH

CHA Atlantic Branch continues after renewing its branch 3 years ago. This year has been an interesting one, with the bi-annual Canadian Hydrographic Conference taking place in Victoria, BC. Several members of the CHA's Atlantic Branch were able to attend including Craig Zeller, editor of Lighthouse. The conference was excellent, and with a superb venue. Particular mention should be made of the excellent closing dinner and location, in the Royal British Columbia Museum.

As usual, CHA Atlantic supported World Hydrography Day, with a celebration taking place on June 20 – slightly before the actual day. One of the events that took place was a barbeque at the historic Oaklawn House, in Dartmouth, NS. World Hydrography Day also featured an excellent and well-attended lecture by Richard (Dick) Pickrill at the Bedford Institute of Oceanography.

The next big event on the CHA calendar came in September, with the recently concluded ICES conference, of which CHA was a co-sponsor. ICES is the International Council for the Exploration of the Seas, and they coordinate and promote research in the North Atlantic Ocean. The conference is a high-profile event, attracting eminent scientists from dozens of countries. The conference was felt to be a good opportunity in which to forge professional linkages for CHA, and elevate the association's profile to some degree.

At last, an update on the construction of cabinets for the display and preservation of a number of historical hydrographic artifacts. It has been an agenda item for some time - that the design and installation of a number of display cabinets would be undertaken by CHA Atlantic. There has been some movement on this, as some of the directors met with a carpenter, and began an assessment of the area in which the cabinets will be constructed.

Finally, an announcement of the upcoming CHA Atlantic Branch, Annual Meeting. As per the Articles of Incorporation, this will take place in December - stay tuned for the details.

CHA Atlantic's World Hydrography Day Celebrations

The CHA Alantic Branch celebrated World Hydrography Day on Friday June 20th.

The day began with a lecture in the Bedford Institute of Oceanography Auditorium. The lecture was given by Dr. Dick Pickrill of Natural Resources Canada entitled "Charts and Maps, Hydrography and Seafloor Mapping; the Past Present and Future". The lecture was very well attended and was well received. The lecture was followed by a reception of cake and coffee.

Steve Forbes, Director CHS Atlantic, with Dr. Pickrill, Natural Resourses Canada, this year's guest lecturer at CHA Atlantic's World Hydrography Day celebrations.

The branch then had a barbeque at the historic Oaklawn House in Dartmouth, Nova Scotia. CHA Atlantic members and guests were invited to this function, and a great time was had by all.

Celebrate...

World Hydrography Day - June 21st

The United Nations, in its General Assembly Resolution A/60/30 of 29 November 2005, "Welcomes the adoption by the International Hydrographic Organization of the "World Hydrography Day", to be celebrated annually on June 21st, with the aim of giving suitable publicity to its work at all levels and of increasing the coverage of hydrographic information on a global basis, and urges all States to work with that organization to promote safe navigation, especially in the areas of international navigation, ports and and where there are vulnerable or protected marine areas."

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LIGHTHOUSE est publiée deux fois par année, au printemps et à l'automne. Les dates de tombée sont le 15 mars et le 15 septembre respectivement.

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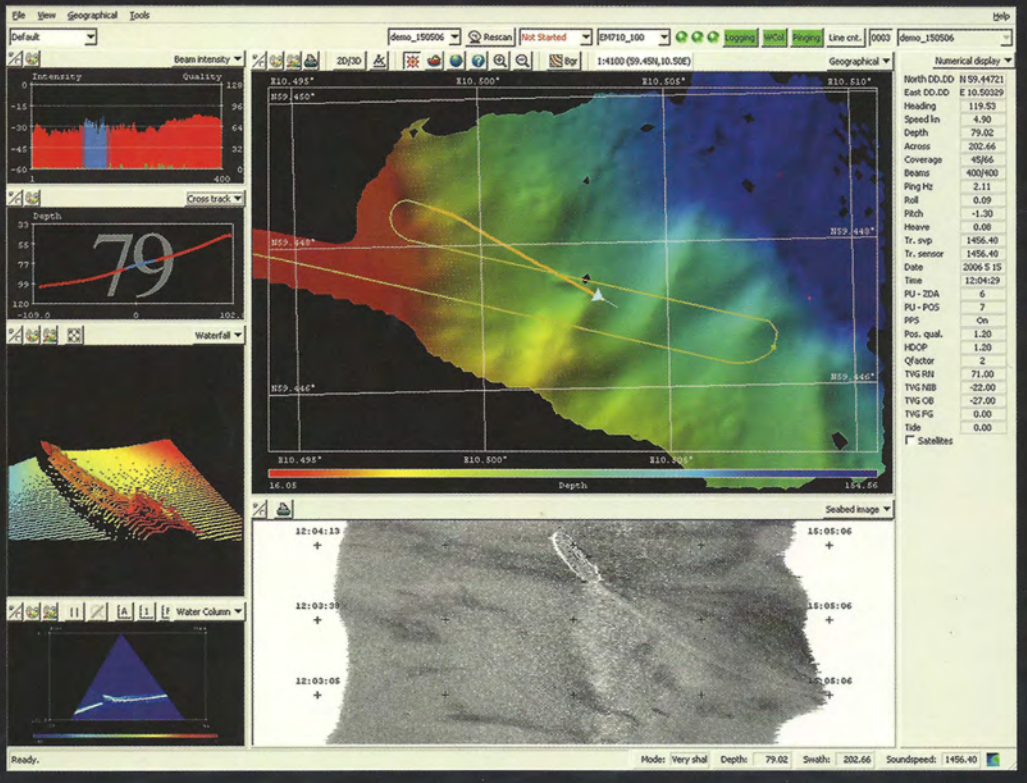

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