

INTERVIEW WITH MIKE EATON, CHS HYDROGRAPHER AND MARINER (RTD)

The Order of Canada

There were three major overlapping phases in Mike Eaton's career: Arctic developments in the Canadian Hydrographic Service, positioning systems development while at the Bedford Institute and electronic chart development after his retirement. In the Arctic he found ways to acoustically measure the depth beneath the ice and developed a rather hairy towfish sounding method from a helicopter in open waters. At the Bedford Institute he worked with Paul Brunavs and Dave Gray on the propagation of the radio ground waves used by Decca, Loran-C etc. Later he became deeply involved in the initial specifications of the electronic chart, and was keen to listen to the users voice which led him to work on the presentation as Chairman of the IHO Working Group on Colours and Symbols, giving ECDIS a face. This year he was made a member of the Order of Canada.

Congratulations Mike with your fine award. How does it feel and what was your first reaction when you were informed?

First reaction - astonishment! Followed by gratification. It was great to be recognised for doing work that I felt was worthwhile.

Contrary to many other countries the Canadian government obviously is aware of the potential for safety of shipping of the electronic chart, leading to your award. Do you agree?

Exactly. I had strong support for many years from the CHS and Canadian Coastguard (CCG). To paraphrase a fellow immigrant from Holland "if I had stayed in England I would have surveyed a small estuary; I came to Canada and took part in the greatest improvement in navigation safety since radar, together with other electronic chart enthusiasts.

Here is my personal experience relating to this question:

- by the 1980s Tim Evangelatos and others had made Canada a leader in digital cartography
- following a 1982 planning exercise on Electronic Charts, attended by Mort Rogoff the true pioneer, The CHS contracted CARIS to have Hugh Astle develop an Electronic Chart Testbed and we operated this in Halifax Harbour under a mariners' advisory group to learn the capabilities and infrastructure requirements for what became ECDIS. On the ground-breaking Norwegian "North Sea Project" initiated by Oyvind Stene and Asbjorn Kyrkjeide in 1988 the Testbed was the only electronic chart using HO data and providing a radar overlay
- a progress report from the Testbed had already served as the basis for Hans van Opstal's 1987 Working Group at the Hague, whose Draft Specifications formed the basis of the IHO's S-52, much of which was later incorporated in the IMO Performance Standards for ECDIS
- by 1989 it became clear that the IHO needed to extend paper chart symbology for this new real-time ship-handling system called ECDIS, and with support from IHO director Adam Kerr I took on chairmanship of the new Colours & Symbols Working Group. Jens Froese, of the Hamburg Sea School, a strong protagonist of object-coded data, introduced us to Gert Buttgenbach, and Canada far-sightedly financed a multi-year program giving birth to Gert's Presentation Library, which was sea-tested on the Hamburg-Harwich ferry in 1992 and has not needed any structural change since its completion in 1994. Meanwhile, with help from Jan Walraven of the Netherlands TNO Perception Institute we had produced the first colour tables and symbol library
- during the mid- to late 1990s we tested and extended the colours and symbols and symbolisation methods, with funding from Germany, Australia and the USCG as well as the CHS and CCG. But ECDIS is still developing and the current edition of S-52 App.2 was produced in 2004 with the unflagging help of Michel Huet at the IHB. By that time another ex-mariner, Mathias Jonas, had taken over as chairman of the C&SWG.

When you worked in the Arctic you found ways to sound through the polar pack ice which was at least two meters thick. Would you explain how you went about it?

For reconnaissance work we used the Arctic Institute method of spot sounding: find black ice; plane the surface flat; pour on oil to bond the flat-faced transducer. But for the narrow entry passage of Hells Gate (so-called for the thick sea-smoke over its open waters) we needed continuous profiles, so we developed a helicopter-towed sounding fish method. It worked, and though I am sure the hydrographers involved will never forget it, it was not as hairy as suggested above.

In your work on the propagation of electromagnetic waves at the Bedford Institute you fostered the use of Loran-C and this eventually replaced the Decca system for your surveys. Would you discuss what reasoning was behind this and did you develop integrated systems when satellite systems became available?

It is a matter of position-line geometry. Hyperbolic systems provide good cuts on a concave master-slave chain layout but poor cutting

angles on a convex layout. Geography provides excellent medium-range concave layouts in European waters, but to get a concave chain layout on the awkwardly shaped convex coast of eastern North America you have to site the master station inland and cover very long ranges. Decca is a short range, continuous wave system whereas Loran transmits huge pulses to get long range, with significant loss of accuracy. For surveying Steve Grant integrated Transit satnav with range-measuring Loran-C to adjust out Loran errors in real time. For chart latticing we did extensive calibration surveys to eliminate the Loran land-path errors.

In developing ECDIS presentation standards you have always supported the view that the mariner's opinions should be sought. However the Colours and Symbols of ECDIS seem to have been one element of ECDIS that has been criticized by mariners as they prefer a more paperlike appearance. Could you explain?

I will never forget seeing the effect of bright sun on the ECDIS screen on a Norwegian freighter at Tromsø with the low sun shining into the bridge, and again on our tests under an awning outside the CARIS office one July. Strong ambient light just washes out the display until even the most prominent features and symbols are very hard to see. You cannot see small details at all. Neat and ornamented little symbols look great on the sales floor of an exposition, perhaps next to low cost as a sales pitch. And the mariner naturally likes symbols he is used to; he may not realise until later that he will not always be able to see them. We had the advantage of being able to aim for safety, rather than sales, and we tried to make sure that everything important on the display would be visible under all viewing conditions. Of course we also tried to make it look as good as we could.

In the past, field experience was essential to judge the results of (radio) positioning equipment. What are your thoughts when you see today mariners and hydrographers putting a total reliance on GNSS? Can we learn from the past? Is radio positioning completely obsolete?

ECDIS must be considered as a whole, part of which is differential GPS when close to hazards, and part is the radar overlay. I agree with the Halifax pilot who said he always checks GPS positioning by the radar fit on coastline and buoys before bringing a ship in on ECDIS. Navais like Loran-C are too crude for ECDIS, and take a swing under structures like bridges. High-accuracy systems like radar transponders or Syledis are still OK locally for surveys or an electronic chart.

You have always been a pioneer on new developments. If you were still active at CHS and had a sufficient budget, what would you like to develop for ECDIS?

Interesting to see a 'fish-eye' display, with scale getting smaller with distance from the ship. Going further, how about a highly selective, variable-scale navigation diagram, with the prominence of objects depending on their importance ?

Are there any things that worry you about the future of ECDIS?

Yes, there are a few:

- lack of HO data has left a vacuum, naturally filled by ECS. The differences in ECS symbolisation between various makes means that mariners, particularly pilots, may dangerously misinterpret the display when moving between ships with varied ECS
 - it always surprised me that while HOs are properly proud of their data, some seem little interested in how it is displayed to the mariner. I believe the IHO was originally founded to ensure that all charts look enough alike to avoid confusion
 - discussion on the Open ECDIS Forum last summer described serious quality problems with some makes of ECDIS.
 - standard-setting is running out of steam, but standards become a drag on progress unless they are kept up to date.
- More than twenty years have past since the development of the electronic chart started. Can you imagine shipowners now are disappointed on the availability of ENC's?

I imagine mariners are disappointed too. We all grossly underestimated the data production task. However, I think governments are the main problem: twenty years ago they funded development in the public interest; now they have to concentrate on services to corporations, otherwise industry goes elsewhere.

At the end, is there any other message you want to get across to our readers?

ECDIS is a huge boon to mariners, but if it is not wholeheartedly supported by the HOs, and the specifications kept relevant, ECDIS will quickly be outstripped by ECS.

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