NEW DATA MANAGEMENT TECHNOLOGY AT CHS

Integrated Database Production Environment

Canadian Hydrographic Service (CHS) recognises the need to improve its processes for data management and product creation to meet the high standards expected by the hydrographic community. From a task rationalisation perspective, CHS needs to reduce production steps, data manipulation and associated errors, and time spent on production process checks. The adoption of database-driven technology was identified to be the key to answering these expectations. CHS has chosen the latest tools developed by Caris to help reach the goal of improving processes for the management of data (points, lines and bathymetry) while maintaining its mission of producing legal nautical documents for Canadian navigable waters in the most cost-effective and efficient manner. An implementation project led by CHS headquarters began in April 2005 in each regional office across Canada. The objectives were to define how the Caris Hydrographic Production Database (HPD) would fit into the CHS workflow and how it would manage source data and products.
Historically, CHS processes required all new data to be manipulated every time it was to be incorporated on a product. In some geographical areas data could potentially appear in several products. For example, Sept-Iles, a port in deep water, appears in seven paper charts and four ENCs.

File-based Production

In the past, CHS managed source data in files, i.e. one file per source document. The files were located on a network drive that could be accessed by all users. Products (paper charts and ENCs) were also managed in files, but archived in a database. Paper-chart and ENC products were generated from the same generic file. To look at a product the user would have to open a working session that would extract the corresponding files, make the analysis and then close the working session.

Handling New Sources

Upon receiving a new source document, CHS standardised it to a common format, a Caris interchange (NTX) file with common cartographic projection, datum etc. Once a document was correctly transformed it was compared with the source documents of the same area to validate the information. This step was time-consuming, as all files located in the area would have to be opened. Proceeding this way was necessary because source documents are received from a variety of different sources: CHS offices, other government agencies, port authorities, engineers, etc. After content validation CHS had to compare the document with the relevant generic files of the area for Notices to Mariners, or update messages for ENCs.
At the next edition of a product, CHS took all the source documents received since the last edition, incorporated them into the generic files and derived the new products from these â€˜updatedâ€™ files. The entire process was complex. We had to incorporate a new source document on every generic file covering the area, and maintenance of products was not very efficient.

HPD Workflow

Following implementation of HPD a more efficient workflow was adoptâ€“ed. Now, when CHS receives a new source document it is opened as a background file in the Source Editor application, the content validated and only the required data loaded into the Database. We do not need to make a file transformation because the application is able to read different file formats. In HPD we can have more than one graphic representation of an object; this means that in one working session we can generalise the representation of the object for each product touched. There is no more need to open each generic file; the new tools require us to incorporate the new source once only. When generalisation is approved it can be directly applied to those products touched by the modification.

Database Environment

The database environment gives CHS the option of connecting to other databases for data exchange. For example, a connection was made to the database containing all aids to navigation operated and maintained by the Canadian Coast Guard (CCG). We now access and use information directly from this database instead of incorporating the aids manually in each generic file. Ultimately, we are working towards an automated process of update. A connection was also created with the CHS metadata database. All process monitoring is recorded in this database.

Obstacles

At the outset of the project we had to make a decision in terms of what needed to be loaded into the database as source. It was decide to load the generic files at best scale. The NTX files that we considered source are archived and can be viewed at any time. Having loaded our generic files into the Database, we incorporated the aids from the CCG database, the new source documents and generated the products. ENC generation is quite easy because the HPD uses a dictionary based on S-57.
We used to generate our ENCs from the paper chart, but since adopting HPD we create a paper chart from the S-57 objects. The definition

of translation files of S-57 objects into cartographic features was necessary. In some cases the application was modified to meet our cartographic specifications. It was also necessary in some cases to update these. For example, in the past we had used internal fonts on the paper chart, but now we are using commercial fonts.

Reorganising Resources

As the project progressed we became convinced of its potential for our organisation. However, a few implementation challenges remained. We knew that a restructuring of our internâ€“al section was necessary. We used to have working divisions defined by activities, like data validation, update section and chart production. We now found with HPD that the applications (Source Editor, Paper Chart Editor and S-57 ENC Editor) were similar to each other. This meant that the knowledge of hydrographers would be focusâ€“ed on the processes and not on the applications used. The new structure is based on a geographical zone; the user validates, incorporates and generalises the data, and then generates a product. We think that the person that analyses the new source document is the one that knows best how to deal with this new data on products. We have found that HPD covers all our needs for source-data management, except for soundings at high density.

The Missing Link

HPD was not designed for the management of high-density soundings. CHS still manages bathymetric data in files. High-density bathymetric management is essential for CHS to cover all its activities, from data acquisition to product creation. The goal is not to manage bathymetry at survey density but at a useful and significant resolution. Caris is currently developing the Bathy DataBASE, a new database-driven technology that will cover this crucial segment of the organisation. The evaluation of this software is in progress in the CHS Quebec region.

CHS main expectations from a bathymetric data management system are ready access to actual valid data, management of historical data, web access, and an entirely integrated solution, from data processing to production. In other words, streamlined processes for reformatting and assessing data and effective data storage and retrieval. Preliminary tests with the Bathy DataBASE system are very promising.

Summary

The implementation of HPD allowed CHS to reach most of its expectations for processes and resource optimisation and the management of source data and products. The next step will be to work on the development and testing of the Bathy DataBASE. Time and effort will be invested in testing in the CHS Quebec region. Some tests are already in progress. What has been observed is very promising and we have very high expectations for the forthcoming release. The marine community of navigators, scientists, engineers and so on, are seeking more information, and a good opportunity arises for CHS to help in the development of a system that will answer those increasing demands.

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