ENHANCING DATA AVAILABILITY

New Generation Hydrographic Databases

The importance of data availability is increasingly being recognised, not just as an important topic for an exclusive section of the geospatial community but all over the geospatial spectrum, including the hydrographic community. If data is not available itâ€[™]s no use!

Traditionally, hydrographic production systems have data spread over multiple (chart) files and might be set up to include (relational) databases e.g. to store point features such as navigational aids. This has, for instance, been done for more than a decade with CARIS GIS, a widely used tool for chart production at Hydrographic Offices (HOs) and in combination with other hydrographic office tools. Such a set-up can enhance the system and management of data within it, but data will still be spread over multiple locations, often split into pieces. Data, or part of it, is also likely to be stored in proprietary formats. But the world is changing; today geospatial data both for land and sea is expected to be faster and more easily available, important for both external users and internal users.

Source to Product

Many HOs have produced products based on other products. This was a natural development in the past, since most HOs had their data available in paper-chart product format. This worked reasonably well, but creating and updating a product from another product is a little like taking a bath after somebody else and having to use the same water. You have to wait for the first person to finish and the water is getting cold (and perhaps dirty!) The new generation of hydrographic production databases will shorten the workflow from incoming source to finished product, thus shortening the time taken for new information to be published. The end result is newer and more correct information. New and updated data in the database thus becomes available for direct use by multiple products and product type, each accessing the same data as soon as it has been entered into the database and is validated. Dependant products will no longer have to wait for other products to be updated or created before data becomes available.

Updates are triggered by retrieval of new/updated information and will be used by operators, for example a cartographer, to update the source database. Such source information might be in textual form (document), as a list of positions (ASCII), in various vector formats (e.g. DGN, DXF, S-57), in raster format (e.g. GeoTIFF, BSB, HCRF) or whatever, as entered, imported, digitised et cetera and used for updating the source database. However, the original source data is useful not only for initial update but is also required for validation purposes, among other things. It must therefore also be available from other processes/tools used in the workflow. Once source data has been used to update the database the updated data must be associated with the original source data, so for each

update of the database historical information is kept. Keeping a history of what source information triggered an update, plus the history of actual changes done, will allow for later historical views of the database and visibility of original source information.

One-off Update

Not only will the shorter road/workflow for the data provide faster availability it will also allow data to be entered/updated just once. After verification, updated data can be used in multiple products and product types without either updating or validation process/work having to be repeated. Some additional processing may be needed in products but this will be limited to product-specific processes, like adding cartographic features such as title fields in paper charts.

More Products

The above approach will be beneficial to all products derived from the database, affecting not only paper charts and ENCs but also publications such as List of Lights, List of Radio Stations, Waypoint Lists, etc. Since these products will be created and updated using the same database (i.e. same data) as the paper charts and ENCs, these publications will follow similar updating procedures using the same updated data. This procedure will also apply to new product requirements as these are defined in the future. Other information published from the same updates will include Notice to Mariners (NtM), which may be collected weekly, or fortnightly etc. for inclusion in the printed NtM booklets and/or for distribution, perhaps via internet.

More Data Access

Access to data has traditionally been limited to distribution through products, standard or special, or through special extracts of data. The latter process has often been complicated by data being spread, for instance having point data in a relational database and line data in a file/chart repository, and so requiring multiple extraction processes and additional processing, such as merging. Not only for external data delivery has this been the case, but also for internal purposes within the same organisation wherein data resides. Current and especially future requirements for data availability demand that data may be accessed internally and even externally. Leading software manufacturers are using new standards for data accessibility providing more data access and easier data exchange.

Open Standards

XML (eXtensible Markup Language) provides the basis for many standards used in data exchange/communication. One of these is the

GML (Geography Markup Language) standard which is 'an XML encoding for the transport and storage of geographic information, including both the geometry and properties of geographic features' and is maintained by the OGC, or Open Geospatial Consortium (formerly Open GIS Consortium). GML provides a common base for geospatial data exchange, not only for 'land' data but also for hydrographic/nautical data. For instance the use of ISO standards, such as ISO19105 for metadata, for standard encoding and growing support for XML and GML now allows geospatial data to be accessed and viewed (and collected/downloaded) using common tools/applications such as simple web browsers such as Microsoft Internet Explorer.

These new possibilities allow, albeit with access restrictions, easier access and exchange internally and externally, for instance for a hydrographic organisation/office to access topographic data in a topographic organisation and vice versa. GML is a standard that is spreading into many geospatial areas, including marine areas, although the S-57 ed3.1 standard is not about to change as the standard for ENCs, as IHO has clarified in its 'S-57 Edition 4.0 Information Paper'. However, the very same information paper also stipulates that "Using GML as one method of encapsulating S-57 Edition 4.0 data fits in well with the overall strategy of using existing standards in order to facilitate acceptance," meaning that GML will become of (great) importance to the hydrographic community. Such OGC standards as WMS (Web Mapping Service) and WFS (Web Feature Service) allow data to be shared and distributed more easily between systems and to be distributed more widely. This is of significance not only for distribution but also for the hydrographic database to access data from other databases/sources that support these standards.

Summary

The new generation of the hydrographic production database is allowing faster processing of data for creation and updating of multiple product types, achieved, for instance through giving products more direct access to their (updated) sources and through a more efficient workflow. The use of ISO standards such as the ISO19000 series (e.g. ISO19115) and of OGC standards such as GML, WMS and WFS introduces a new level of data sharing and distribution for both internal and external benefits. The overall picture is one of data being made available more directly and faster through distribution of 'traditional' products and their updates, and also through direct (internal and/or external) access to the source data. An approach that also will be a preparation for future requirements.

References

- XML: The World Wide Web Consortium (www.w3.org/XML)
- GML: The Open Geospatial Consortium, Inc. (www.opengeospatial.org)
- Registered OGC products: The Open Geospatial Consortium, Inc. (www.opengeospatial.org/resources /?page=products)
- IHO S-57 Edition 4.0 Information Paper available at IHB (<u>www.iho.int</u>)

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