Hydrographic Charting Data Management Challenges

Three years ago we discussed the global proliferation of large coastal hydrographic charting-based projects. More recently the topic was large, multi-month MBES applications on a variety of regional seabed mapping programmes ranging from oil exploration applications to multi-year seabed searches for accident investigations. MBES and associated hydrographic charting programmes on the scale of multiple ships, multiple months and long distances from home-base have placed extreme pressures on data volumes management and moving that data to the client in an efficient, cost effective and timely manner. Added challenges include breakthroughs in the collection of water column and high density backscatter imagery, which can increase the data volumes by an order of magnitude. With recent breakthroughs in data management and data transfer, the industry is poised for significant changes on managing, moving and manipulating data between active collection offshore and near real-time results onshore.

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Today, a typical regional seafloor geochem seeps study is based on the collection and processing of upwards of >500km^2/day of terrain, backscatter and water column anomalies over 30+ days of continuous uninterrupted operations. This collection routine yields > 400 gigabytes of data per month that is desperately anticipated by clients and analysts onshore. This rapid delivery, turnaround and integrated interpretation is essential to meeting the goals of identifying, prioritising and collecting the geochemical phase of the programme, without any significant delays or vessel swaps. This ability to move the full dataset between the vessel and shore, or vessel to vessel, also allows for real-time interaction between the client/analysts and the field teams. This in turn allows for scope or target area modifications, ensuring the best utilisation of the expensive vessel asset and focus on the most important areas of interest. Gone are the days of isolated data collection over several weeks of field ops, followed by additional weeks of cleaning and tuning the data ashore, before eventually providing the results to the clients.

Another example of the advantages of large-scale data transfer can be applied to seabed search programmes in remote locations that can last for many months. In this case, the client and analysts are eager to locate and identify the target of interest as rapidly as possible. The data transfer capability of large-scale MBES derived terrain data and side-scan sonar imagery, allows multiple shore-based teams of experts to immediately begin the process of combing through the gigabytes of information. As with the previous example, this brings the ultimate decision makers directly into the strategy discussion for any required changes in approach, areas of interest or rapid decision making. This is a critical advantage over just a few years ago when the entire dataset could not be reviewed by the interested parties until days or weeks after the last instrument was stowed and the vessel was heading to port.

From these recent examples of successful applications of the technologies, it is easy to see that the near future will include this application for nearly any type of offshore data collection based programme. Combining these capabilities with hydrographic charting requirements that traditionally relied on intensive staffing coupled with the decrease of satellite bandwidth cost and cloud-based processing technologies maturing, it is feasible to see how the large labour force can begin to be shared from a shore-based team of hydrographers that can easily process data from multiple platforms. Add to this the near term expected usage of multiple ASVs for multiple data collection applications and even more data volumes, then large-scale data transfers and the associated shore-based shore support services are likely to be the norm very soon.