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A port fit for a 'Queen'

John Pepper and Maik Weidt describe how Britain's number one vehicle and container-handling port and Europe's leading turnaround cruise terminal is making sure it's fit for the future

In 2013, OceanWise published an article in this magazine explaining how its data policies, management systems, stakeholder engagement and new technologies were evolving into the provision of an infrastructure capable of taking ports and harbour operations to a new level, operationally. This follow-up article explains how ABP Southampton is now delivering its maritime information infrastructure in the port.

The Port of Southampton, part of the Associated British Ports Group (ABP), has significant land and marine-based operations and assets that underpin two significant business tasks: conservancy, which ensures that the port is resilient to known and unplanned risks, and compliance with national, regional and international laws and conventions.

To perform these tasks effectively, asset management, surveying, dredging and engineering activities take place on a regular basis, while safety and security policies are under constant scrutiny, as are the wider environmental factors pertaining to the port. This article explains how ABP benefits from its three-year relationship with OceanWise and describes how other ports can realise similar benefits in our modern digital world.

Data and workflows

Business and operational data, much of it having a spatial context is collected to ensure the right decisions are taken. This is stored, accessed and portrayed in a Geographical Information System (GIS) and uses the functionality of the system to generate plans, reports and regulatory outputs in the form of maps. These can be used internally (e.g. by another department) or externally (e.g. for submission to a regulator or as general information for the public).

Using the Cadcorp SIS as its GIS platform, ABP Southampton has realised increased operational efficiency and reduced risk resulting from improved data management and workflows. The latter encompass hydrographic surveying, planning and management; chart production (including digital charting used by ABP pilots and Vessel Traffic Services (VTS)); dredging planning and management, as well as asset management and conservancy.

Chart production

The keys to modern and efficient paper and digital chart production are robust workflows and access to reliable data. Much of the data used in chart production is used elsewhere in the port and is

centrally managed data to avoid duplication. It also streamlines the process from data acquisition to chart production and dissemination and is less prone to error arising from outdated or incorrect data.

In using the approach outlined above, data from ABP's survey control and data acquisition software is imported natively into the GIS where it is combined with infrastructure and other required datasets (see below). Paper chart production is facilitated directly using the GIS whereas OceanWise's Maritime Toolbar and ENC Writer Extension are employed to produce digital charts. The latter are output in S-57 format (bathymetry and port ENCs and Maritime Information Overlays (MIOs) for use with Portable Pilot Units and Vessel Traffic Services

Hydrographic surveying and dredging

While ABP Southampton had systems in place to register and record hydrographic surveys and associated dredging, these were no longer being updated to reflect changes required in the day-to-day running of the business. OceanWise was able to provide Maritime Toolbar Extensions that give the same level of functionality, i.e., recording all published surveys and details of dredging. In being maintained externally, this approach has delivered a saving on otherwise bespoke maintenance costs.

The move to a centralised system has led to the removal of approximately ten legacy databases and spreadsheets and transformed ABP's work processes. Ocean Database (ODB) acts as the central data store and utilises SQL Server 2008 to exploit SQL Server's spatial functionality. ODB is able to store many simple and complex port-related data types, including navigational aids, berthing information, water and seabed quality samples, and real-time and predicted tides. ABP Southampton is also now able to streamline survey planning by linking the GIS with ODB to see, at a glance, those areas recently surveyed or due for survey.

Infrastructure and asset management

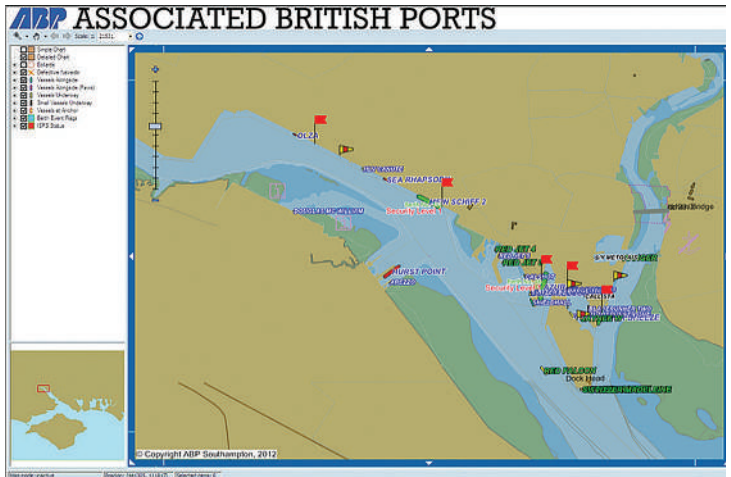
As with many ports, the same data is often required to support different business processes and systems. Historically, this data has been stored more than once within each application, or in different formats and/or locations.

Now, by using OceanWise ODB as a central data store, ABP Southampton is able to link its existing PAVIS (Port and Vessel Information System) system to ODB, so data is managed centrally and any updates take place only once with all systems reflecting the latest changes. This same dataset is also used as the input to create Marine Information Overlays (MIOs) used in the VTS RADAR system – a move that leads to greater efficiency and consistency across the Port.

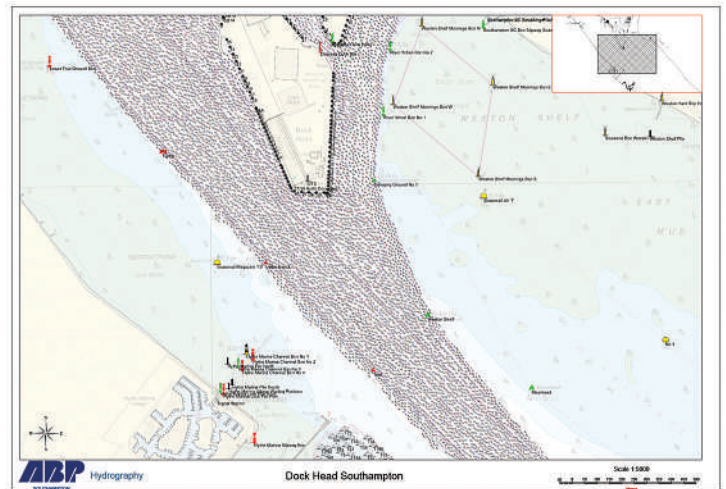
Conservancy management

All ports are now under a statutory obligation to report their activities and OceanWise Maritime Toolbar Extensions have enabled ABP Southampton to do this in a much faster and more robust fashion. With the Toolbar, it is able to process dredger logs using automatic tools and generate inputs to reports required by the regulator. Using "3 clicks" to create the bi-annual Disposal Licence Return to the Marine Management Organisation (MMO) has achieved significant savings in what was once a time-consuming and resource-intensive process.

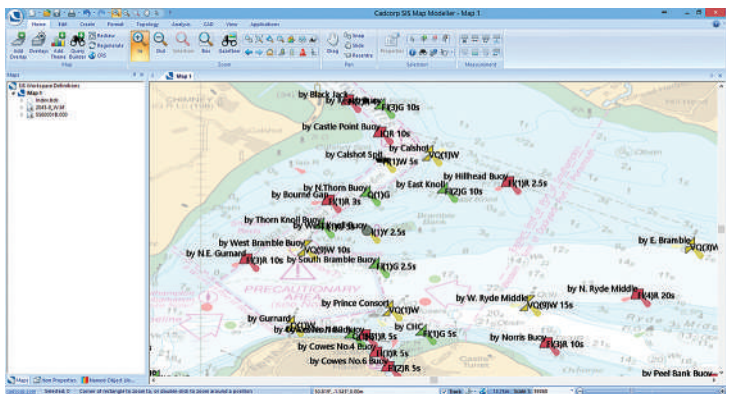
Furthermore, by linking the Annual Licence Return to OceanWise Environmental Samples Management Extension, recent sampling results from a specific dredge or survey area can be easily assessed. This includes the ability to highlight results that may exceed the defined MMO Action Levels. As with other port information, this data is stored centrally and can be exported from the database into the GIS to display the results in a graphical form, thereby offering new



Situational awareness data available online to VTS
Image: Associated British Ports Southampton, 2015



Dock chart overlay – just one of many charts generated in both paper and digital formats by the GIS for multiple purposes
Image: Associated British Ports Southampton, 2015



Maritime Information Overlays created using GIS and published to the VTS RADAR system
Image: Associated British Ports Southampton, 2015

analysis opportunities. As an additional benefit, the Hydrography Team is now able to provide customised, automated reports to assist senior managers in decision-making and compliance matters.

ABP Southampton is now reaping the benefits from streamlined systems and data flows, with improved efficiency, safety and cost reduction being enjoyed across its business. Needless to say, the tools and techniques being used, coupled with its implementation of Lean Data Management, are being closely studied at home and abroad.

John Pepper is a Director of OceanWise (www.oceanwise.eu) while Maik Weidt is Port Hydrographer for ABP Southampton (www.abports.co.uk)