

CROSS-PORT BENEFITS OF GEOSPATIAL TECHNOLOGY

The benefits of modern GIS systems do not need to be restricted to just one or two experts in a port. **Alex Hughes** finds out who else can put geospatial data to good use

Ports making smarter use of geographic information system (GIS) digital platforms to store information about land and assets are benefiting from improved geospatial data management throughout the business, within budgets that don't break the bank.

From its base in Los Angeles, NSGIS, a geospatial systems integrator specialising in ports, has worked on GIS projects with ports in Los Angeles, Long Beach, Oakland and Tacoma, among others. Its role has "varied greatly" with each, according to company president and chief executive, Daniel Elroi.

Most ports tend to focus on "static" data, defined as data that rarely changes or only changes slowly, such as port infrastructure, legal boundaries, or topography. Some so-called static data does change more frequently, especially bathymetry and aerial photography, but fewer ports integrate these with their GIS.

But the most sought-after data to be rendered in digital format is related to utilities, structures, leases, and waterfront infrastructure, says Mr Elroi.

Dynamic operational data can also be digitalised. This includes vessel location and information, cargo, police vehicle, health safety and security data, movement of vehicles in and out of terminals, or people in and out of buildings, weather, tides, and security camera feeds. All of this data is spatial in nature, and NSGIS has helped a number of ports to integrate this into their map viewers, their situational awareness systems or other operational systems.

BEYOND INSTALLATION

UK-based OceanWise has worked on various geospatial systems integration projects. Managing director Dr Mike Osborne comments that installation of a GIS system alone will not deliver simple and rapid access to cartographical information.

"The key to successfully implementing GIS is by developing and implementing data governance and a geospatial data management strategy. GIS is software, just like Excel or Word, and is nothing without the policies and procedures that underpin it," he says.

Any strategy, he adds, should be proportional to the port's business and operational requirements. In fact, this has been a common factor across all of the projects OceanWise has successfully delivered, coupled with small steps but with a view on what can be achieved overall.

"Pretty much every department within a port could benefit from GIS, even ones where this might not be immediately apparent. An example is where OceanWise personnel helped a port migrate a spreadsheet of its 50+ private vessel moorings to a geospatial database and then linked that database to its finance system, so ship and owner details could be managed in a more joined up and hence efficient way, saving time and money, and reducing the risk of errors occurring," says Dr Osborne.

Mr Elroi agrees that end-users should not have to spend inordinate amounts of time learning systems in order to get to the information they need quickly.



EASIER ACCESS

Nowadays, the primary means for end users to interact with GIS is through Web GIS and apps that engage a broad range of users where and when they need specific information, analysis or outcome.

"The reason that GIS has seen a resurgence in applicability to ports is that not only have the apps become easier to use, but the approach to using them has changed in the past few years," notes Mr Elroi.

He points out that in the past staff were presented with a highly complex map viewer, with many buttons and options that required training and constant reinforcement through repeated use. Today's Web GIS-based approach seeks to provide "just in time" apps that deliver less overall functionality per app, but greater focus on each end-user's immediate challenges. These can be identifying potential underground hazards prior to excavation; quickly collecting the location and information about an accident at a terminal; confirming that two hazardous cargoes were not placed closer to each other than regulations permit; determining a port's properties' overall occupancy at a particular moment; identifying under-performing leases; or communicating the next window for a bathymetric survey boat to have clear access to a dock in a busy container terminal.

"In these examples, the aim is to put geospatial information and analysis at the hands of management and regular staff, rather than keeping it the exclusive domain of one or two GIS experts in the port," says Mr Elroi.

He claims that, when properly planned and deployed, GIS can and should be an enterprise system, meaning that it sits at the same level as ERP, email, and document management systems.

■ Apps for GIS have become easier to use

■ Geospatial information and analysis should be in the hands of management and regular staff says NSGIS' Daniel Elroi



■ Every department within a port could benefit from GIS

"When sponsored by an executive, governed by a director-level steering committee, managed by a technical committee and fully supported by a port's information management professionals, GIS can impact on every department of a port," he says.

CROSS-PORT USE

Even departments where there is no obvious use can benefit from GIS. Human resources, for example, could use GIS to identify employees who can carpool to travel to work together; the business development group can use interactive "story maps" to improve the telling of their port's story to potential shippers; and the legal team can use digital maps to determine potential boundary conflicts between leases.

"When it is deployed well, the executive team can use map-enabled dashboards to determine at a glance the current plans and returns in one to two hours when it used to take one to two days.

"Savings across all GIS projects are achieved by users having immediate access to key information, so their time is not spent finding, requesting, retrieving and sometimes reformatting data to meet their requirements," notes Dr Osborne.

SECURITY BENEFITS

Mr Elroi recalls one port that had invested heavily in security cameras and a video management system, but the value of the investment was limited primarily to the security department. By linking live video feeds to GIS maps, the security personnel were able to have better situational awareness, access information about tenants and infrastructure in response to incidents visible to the cameras, and also share limited aspects of the video with non-security port operations staff.

"This greatly increased the value that the port realised from their investment," he says.

Another port uses their cloud-based GIS subscription to bring their promotional materials to life, with interactive maps that allow their business development staff to present their port more effectively to potential shippers and thus win business for the port.

"The data was already there, but only used for engineering purposes. With this approach the business development staff were able to squeeze more value out of that information."

Mr Elroi says that port authorities can not only reduce cost through GIS deployment, but also reduce risk.

Reducing costs comes from eliminating repetitive and time-

operational or even financial health of the port's facilities and asset portfolio," says Mr Elroi.

One interesting use of GIS technology has been in regional security and operational co-operation, with ports in Western Canada and the US leading the way. Some are proactively collecting and disseminating information that helps shippers get their cargo faster, truckers make more money, and keep the environment cleaner. Others are sharing security information with both local and regional stakeholders, thereby helping to reduce crime, fight against human and contraband trafficking, and step up efforts to thwart terrorist activities.

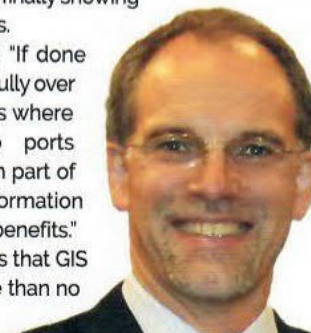
Dr Osborne notes that ports OceanWise has worked with have seen tangible benefits. At Peel Ports, for example, it helped migrate dredging and licensing data to a geospatial database and, using OceanWise's GIS-based tools, Peel Ports personnel are nowadays able to complete work on dredging consuming tasks, such as digging around in a paper records room, avoiding unnecessary expenditures (such as paying a contractor to resurvey prior to construction, when that survey has already been performed recently by another contractor) and reducing wasted efforts, such as using map-based work orders so that repair staff go to the correct asset and bring the right materials the first time. "In the area of records retrieval, for example, we have heard of reduction in time in the order of 90%," he says.

In the future, Mr Elroi says that use of GIS for strategic asset management is potentially the most exciting area.

"This is a data-driven, risk-based, multi-faceted approach to decision-making in a port, where multiple factors are used to help decide investments in new assets, repairs to existing assets, or disposition of failing or redundant assets. GIS can play a major role in building strategic asset management systems, and this is an area where ports are finally showing real interest now," Mr Elroi says.

According to Dr Osborne: "If done right, proportionally and carefully over time, then there are no areas where digitalisation cannot help ports develop. But it needs to form part of an overall data and information infrastructure to deliver real benefits."

Here, he soberly concludes that GIS poorly implemented is worse than no GIS at all.



■ OceanWise's Dr Mike Osborne believes the key to successful implementation of GIS is good governance and an appropriate strategy