BP's One Map provides a 'one-stop-shop' for geospatial information – the user-configured dashboard here, shows a map of fields, analytics, the control room and subsea images, as well as real-time and logistics data

Source: BP

Putting digitalisation on the map

Driven by the energy transition, digitalisation is having radical impact on the geospatial community worldwide. BP has implemented a global mapping, reporting and analytics platform, One Map, while Shell sees advanced geospatial technology as core to many emerging digital technologies. *Brian Davis* reports.

Mapping lies at the heart of the hydrocarbon development lifecycle, from exploration, through discovery and production, to distribution and decommissioning. The industry is hungry for vast volumes of secure, quality data, where accurate location information is available in any format, on any desktop, laptop or mobile device, anywhere, in real-time in a user-defined view. Sounds like a tall order, well not anymore.

BP, for example, has developed a global mapping, reporting and analytics platform – One Map – as a one-stop-shop for geospatial information. The single platform is 'citizen-driven' by users, is very accessible, with common functionality, and is reported to have dramatically increased and transformed workflows in the company.

Brian Boulmay, Global Geospatial Data Domain Lead at BP, explains: 'One reason for trying to get One Map right is that almost every function we have leverages a map at some point of the business process.' However, there were many different versions of data from process-to-process, vendor-to-vendor, and even within vendor versions, without a shared platform. There was also duplication of information and gaps, and finding what was needed was often difficult.

The One Map common platform lets users leverage and share information, both static and dynamic to meet a variety of business needs – from base maps to analytics, with high quality imagery, infrastructure, site surveys, environmental information and other resources. It is now used by teams, regions, functions and disciplines worldwide. 'BP's vision was to make digital mapping accessible to every employee, wherever located,

via desktop PC, laptop and mobile. In BP, this meant focusing on three key areas – People, Process and Technology,' says Boulmay.

Geospatial information systems (GIS) had been used in BP since the 1980 in different ways round the world, with different versions, alternative approaches and various security levels. There was also a need to support analytics and be able to connect to Big Data systems and real-time streams of information, both onshore and offshore, as well as with the Internet of Things (IoT) and a massive network of sensors coming onstream. In addition, a mountain of static, real-time and historical data needed to be handled.

'The main driver was to get everybody on the same map, literally, anytime, anywhere, however they operate', remarks Boulmay.

The One Map initiative started in 2015 and the technology was fully deployed 18 months later. 'The roll-out continues, but we don't put process where we don't need it. That's important with enterprise systems, as the traditional IT process is over-controlled. In the citizen-developer scenario you can't! If people have a hard time getting access or can't find information, they will find another way to get the job done,' says Boulmay.

BP made the system very open to use. 'When you deploy a system like GIS, there is no cookbook or user manual, because you don't know what users are going to do. The workflows that come up are incredibly creative. For example, we are now doing real-time tracking of seismic operations; progress-to-plan; collision avoidance; deviation-to-plan. These were areas that were never part of our original design. It's impressive what you can do when you go platform,' he says.

A platform-driven approach can be driven-out faster; some datasets are managed, some processes are standardised; but using a platform should not be locked down. Great information becomes open and available to different services and business units via portals. Interestingly, when information is published, people create their own views. This encourages collaboration. Data is only managed once, there is less duplication and analytics are

available to everyone.

The GIS data has different levels of access according to BP team requirements internally and exposure to third parties on field surveys, construction, emergency response and the like.

The platform is a big mix supplied by about 30 different vendors with over 100 applications, covering everything from mapping to remote sensing and GEO-IT. Esri's ArcGIS is a core part, which manages the geographic data. One Map has been rolled out to 12,600 registered users as a web-based platform, and 600 desktop users across the 70,000-person organisation.

The system was rolled out by a small hybrid team of IT people for hardware and software, and data managers for the workflows, data and processes. 'Basically, business needs to be in the driver's seat when a project is so cross-functional,' says Boulmay. Furthermore, the budget was very fixed and small. The original team had just two IT people and two on data. Now it's gone up to a hybrid team of 10. 'We came in on time and on budget, and exceeded the target to reach 10,000 users by the end of this year [2018],' says Boulmay.

He insists: 'Location is everything we do. Think how we used our phones 10 years ago, and how we think of them now: giving directions, indicating the cheapest gas, with kids playing Pokemon Go and other augmented reality games. Digitalisation is driving those capabilities.'

'In the oil and gas sector, you will be able to walk to any wellhead or facility. Hold up your mobile and it will know where you are standing, and which piece of equipment you are trying to interact with. It will bring up a view of whatever you require, a 3D model, a purchase order, maintenance schedule or the latest inspection results. You will be able to interact with the data seamlessly, based on your location. The location is unique and agnostic, regardless of the system or function. That's the beauty of digitalised GIS.'

Beyond maps

Meanwhile, Shell claims it was a pioneer of the platform approach to digital mapping, with My Maps, based on the ArcGIS portal developed by Esri. 'We were the first commercial implementation of the platform, initiating a project in 2011 to provide a window for Geomatics to manage and share our geographic data,' says Robert

Dunfey, Senior Geoinformation Consultant and Team Lead at Shell.

Speaking at Esri's recent European Petroleum GIS Conference in London, Dunfey explained: 'It's not really about technology. My Maps is simply the window to all the data that underpins it. The important thing is that you can trust the data, and essentially that's our role as Geomatics.'

Geomatics is the source of geospatial expertise at Shell and has five core competencies – geodetic integrity, geodesy (getting things in the right place), survey and positioning, earth observation, and geospatial information management and analytics.

Digitalisation has revolutionised GIS operations. 'At the very highest level, we recognised that digitalisation was a big opportunity for Shell,' says Dunfey. Early in 2018, the Digital Centre of Excellence (Digital CEO) was established with a strategy for a coherent approach to digitalisation. Geomatic's role is to work across the business, applying digital technology to unlock potential value. A key theme is to treat 'data as an asset'.

Faced with significant new entrants to the energy industry, like Tesla's electric vehicles and battery storage technology, Apple's aim to sell excess power from server data centres, Google, GE and other initiatives, the oil and gas sector is faced with massive disruption of existing value chains but also significant opportunities.

The Digital COE identified key technologies that have significant relevance for the energy sector, including the Cloud, mobiles, advanced analytics, 3D printing, IoT, robotics, AI and machine learning. Shell Geomatic's role is to apply some of these technologies globally.

Shell's Enterprise GIS is a platform approach based on Esri's ArcGIS, FME and My Maps. This platform has been evolving and Enterprise GIS now has a significant role in Shell's digitalisation strategy.

Take the IoT. According to market analyst Gartner, 21bn devices are connected to the Internet. 'That's three for every person on the planet,' comments Dunfey. But this trend in the consumer space can also be seen in the industrial space. About five years ago Shell started working with Esri on implementation of a geospatial events server coupled with My Maps, as a GIS portal supporting real-time data with Big Data sets. This platform now

provides geospatial intelligence for IoT implementations.

My Maps is also used to track seismic and other vessels, rather than using a traditional mapping system. Indeed, maps are critical for Shell to support responders to plan and execute response to incidents. The digital maps provide a 'common operating picture' for people involved in Shell or other organisations, such as government bodies, NGOs or contractors, via Esri's portal for ArcGIS.

On the robotics front, Geomatics has worked in over 20 countries deploying drone technology for projects. Furthermore, Shell Exploration and Geophysics launched the Ocean Discovery X prize in a $7mn competition to encourage development of underwater autonomous vehicles.

In the mobile arena, any information loaded in the My Maps portal is accessible on Android or iOS devices. In Iraq, mobile devices are used to locate pipelines, rather than using conventional database maps.

Shell's Enterprise GIS platform is now deployed across the world – for unconventionals in the US, exploration in Brazil, and for right-of-way applications in The Netherlands, for example. Dunfey mentions working in Malaysia, where asset teams often present digital representations of physical assets, acquired by data sets using laser scanning and 360° photogrammetry to build and view digital twins of installations.

Important applications for safety and interactive hazard identification use 360° photogrammetry and augmented reality. There has also been a move towards digitalisation downstream, working to create a digital twin of the Deer Park refinery, Houston. Furthermore, cheaper satellites are proving to be a game-changer, using advanced GIS solutions for facility revisits.

'It's more than maps,' says Dunfey. 'With their permission, we can track staff via their mobile phones then use analytics to help route people to undertake work packages more efficiently.' In fact, Shell acquired a company called QGC, as part of the BG acquisition, which uses GIS to track assets in the field – to optimise routes to well workovers in concert with My Maps.

Dunfey concludes: 'Geospatial is a core component to successful deployment of digital technologies, and an opportunity for geospatial professionals to help provide a competitive edge.' ●