

## TECHNOLOGY



Oil and gas drilling is on the cusp of a revolution, made possible by the increased integration of IT and 'Big Data'. Until quite recently, there had been little improvement in the speed in which wells were being drilled, compared with 25 years ago. But this is changing as modern IT is brought to bear, allowing drillers to drill more quickly and safely and at lower cost. At a recent industry conference, Daniel Yergin, IHS Markit's Vice Chairman, observed that Big Data was going to be 'the next technological breakthrough for the upstream industry after shale drilling'. The task is to make drilling less wasteful and more efficient. Mike Dyson, Director, Oil and Gas Practice with professional services company Navigant, estimates that a deepwater drilling rig can have up to 25% non-productive time.

Traditional practice in many companies is for data to be collected from drilling rigs every 15 minutes. However, the use of 'real time' data centres, where information from key drilling sites is brought to a central location allowing experts to examine the data and make decisions, is

## Revolutionary cusp

expanding and saving drillers time and money. The sheer volume of data that is capable of being generated from drilling operations is huge. Indeed, according to some estimates, a typical offshore oil platform generates up to 2 terrabytes of data per day, which is the equivalent of 1 million digital camera images.

### Greater collaboration

Much of the data is shared among the operating companies, service companies and vendors.

There are a number of drivers to this greater incorporation of IT and data. Clearly, the prolonged oil-price slump has forced drillers to look beyond tweaking drill-bit design and other incremental improvements. But there is also the need for oil and gas drillers to catch up with other similar sized industries in their use of data.

To that end there has been an up-tick in collaboration between a whole swathe of players in the

### 'Big data' is set to overhaul drilling technology, writes Nnamdi Anyadike.

upstream industry, including drillers, data vendors, equipment suppliers and service companies. In August 2016 Schneider Electric and Halliburton announced a collaborative effort to develop a cloud computing platform for the upstream oil industry. The platform connects Schneider Electric's 'Internet-of-Things' (IoT)-enabled system architecture and EcoStruxure platform with Halliburton's DecisionSpace software. Participants including scientists, engineers, software developers, oil companies, service companies, data vendors and technology developers, are given access to the code that creates DecisionSpace. The platform itself

A directional driller reviews computer monitors while drilling for oil in the Bakken shale formation, North Dakota

Source: [www.breakingenergy.com](http://www.breakingenergy.com)

*'[Big Data is going to be] the next technological breakthrough for the upstream industry after shale drilling.'*

**Daniel Vergin, Vice Chairman, IHS Markit**

is provided by Landmark, a Halliburton business line and provider of integrated E&P software.

The participants, known as the OpenEarth™ Community (OEC), are then able to revise it and add it to the platform for their company's specific needs. Benefits of the platform are said to include faster feedback between well production equipment and the reservoir model, improved asset performance, increased operational reliability and simplified decision-making.

Harold Mesa, a Vice President at Halliburton, forecasts: 'Ten years from now, everyone will use DecisionSpace.' One company that is already benefitting from the platform is Athabasca Oil Corporation. Fred Schwering, Field Development Planning Specialist at Athabasca Oil, says the software is used to plan well pads and design horizontal wells in the Montney play in Canada. The previous workflow, which involved planning single pads one at a time, was widely seen as inefficient.

The model considers future additional wells on pads and helps optimise field road routes and pipeline corridors. This modelling has reduced shut-in times on high-volume production wells and prevented lost earnings. As a result, costs have been reduced and pad-planning cycle times cut to weeks or days from the previous months. There is also an increase in reservoir coverage.

Halliburton's rival Schlumberger, however, is not part of the Schneider Electric-Halliburton created DecisionSpace OEC. Instead, it has opted to develop its own Big Data via cloud solutions. It is doing this with the support of its Software Technology Innovation Center in Silicon Valley, together with other collaborators, including Chevron.

At the 'Google Next 2017' conference held in San Francisco this March, Ashok Belani, Executive Vice President of Technology for Schlumberger, said that the aim is to develop architecture to run advanced algorithms in the cloud to meet precise needs – faster, and in greater detail, than ever before. 'We are now leveraging the strengths offered by cloud computation stacks to bring our data processing to the next level... We are identifying new ways of working with Big Data that will enable the next step-change in performance improvements for our operations,' he said.

Meanwhile, ConocoPhillips is using Big Data to help drill wells

far more quickly. Ken Tubman, Conoco's Subsurface Vice President, says: 'What once took weeks now takes hours.' The company was an early adopter of Big Data analytics, acquiring huge data sets over decades. Its approach is to adopt what it describes as a more fit-for-purpose approach to responding to information coming from various equipment sensors. It prioritises issues involving safety and environmental protection, which receive immediate attention, allowing some equipment issues to be handled later.

BP has also taken decisive steps towards the incorporation of Big Data into its drilling activities. At the end of last year, it announced a collaboration with GE on the deployment of a new cloud-based integrated system called Plant Operations Advisor (POA). This is a software platform that is used to collect and analyse data from industrial machines and is built on GE's existing Predix operating system.

The platform rapidly integrates operational data from producing oil and gas facilities. Notifications and analytical reports are then delivered to the engineers so they can identify operational performance issues before they become significant. Simplified access is provided to a variety of live data feeds, including visualisation capabilities and a real-time facility threat display.

The oil major has already started using POA, with some notable success, to manage the performance of one of its platforms in the Gulf of Mexico. The company will deploy it to other BP facilities around the world this year. Further to the BP collaboration, GE has announced plans to make this technology available to the entire oil and gas industry soon.

Meanwhile, Shell also has a system in place that globally maximises its production from existing assets through standardised practices and knowledge sharing. Its Wells, Reservoir, and Facility Management (WRFM) programme, created together with SAP SE, is described as a next-generation toolkit for wells and reservoirs. The planned solution integrates information from over 20 data sources and is the first step toward a renovated 'smart solutions' platform in Shell.

The use of WRFM and other cost saving measures are part of Shell's new business concept, described in *The Wall Street Journal* as budget deepwater drilling. On the Mars oil

platform in the Gulf of Mexico, Shell engineers are working to wring more oil out of this massive field and keep it profitable 'even if oil sinks to \$15/b'. Shell also wants to use this approach to make its new deepwater projects in Brazil cheaper and faster.

#### **Cost is key**

Ultimately, it is the ability to drive down cost that will be the key factor in underpinning the increased take-up of Big Data and the greater use of IT in the upstream sector. In a recent paper, GE Oil & Gas said the industry will best create value by finding a way to integrate its fragmented operational information systems. 'For example, there may be a system that manages logging data during a drilling process, another system that manages logistics and fleet for supply chain, another for monitoring and diagnostics of artificial lift equipment, and so on,' it stated.

All of this is now in the pipeline and *Forbes* predicts that the new drilling technology, backed by enhanced data and IT, could spark 'an explosion of oil' before the end of this year. The technologies that will bring this about are moving rapidly toward deployment and this will lead to considerably lower drilling and production costs. With these new technologies in place *Forbes* sees crude oil production being freed from its high cost shackles and fully capable of surviving at prices well below \$50/b.

It reported: 'In some cases, the amount of oil produced per dollar spent on drilling is going to more than double. There are significant chunks of the petroleum-producing parts of the US where \$40 oil will not be a barrier to drilling and new production. Eventually – in a few years – these techniques will begin to show up in wells around the world, and there will be an explosion of oil. Even as many oil fields dry up, there will be new fields developed from previously unprofitable sources.' For drillers, a brave new world of low cost production has only just begun. ●