

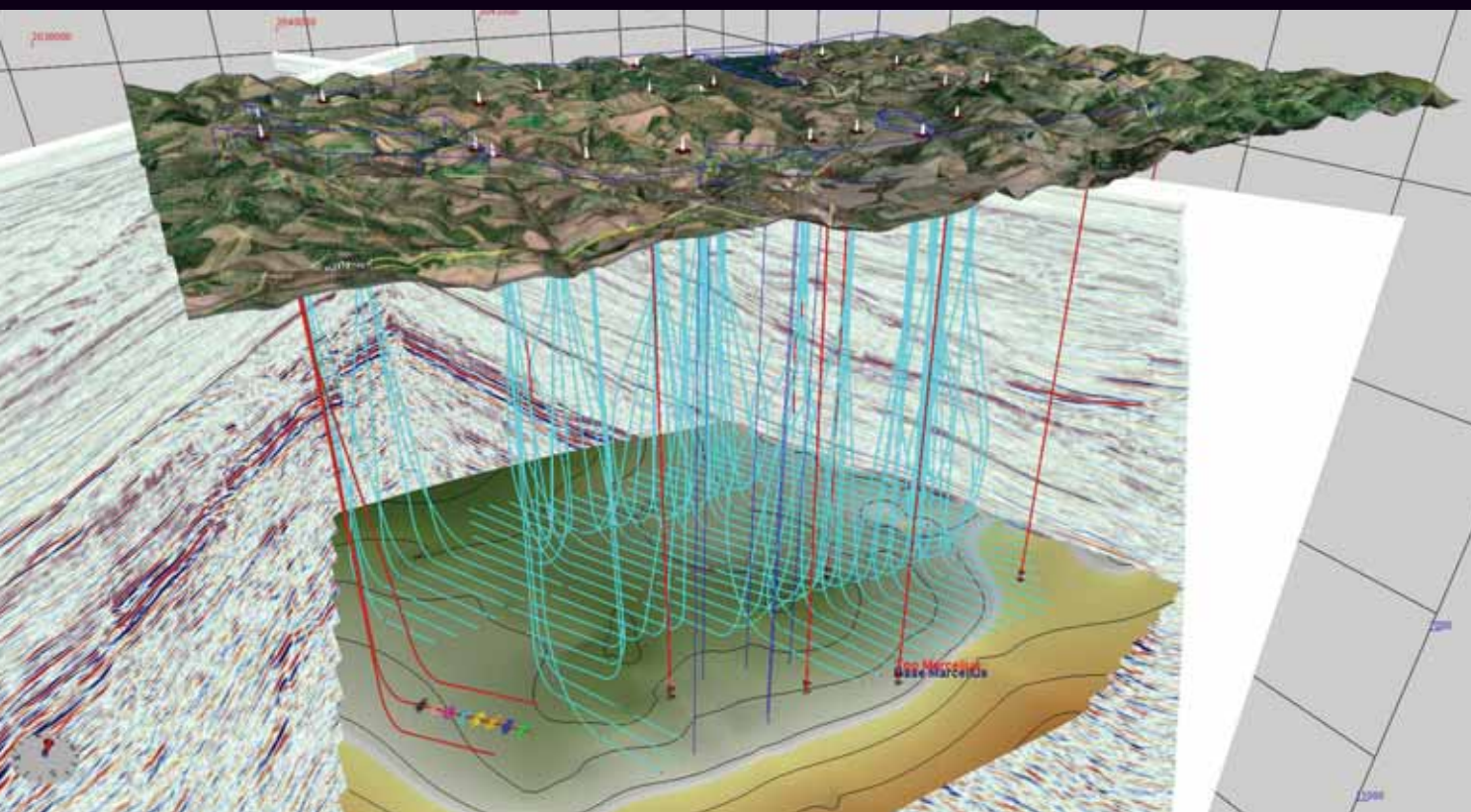
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Issue 27

If integrated operations is a no brainer why aren't we doing more of it?

Using expertise developed with NASA to help with real time operations



How Chevron uses software to manage business processes
The case for a standard IT architecture



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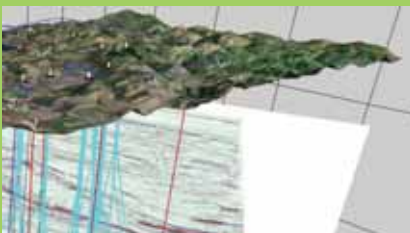
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Cover photo: Landmark's Collaborative Well Planning software allows users to plan wells in minutes instead of months, since the software enables visualization of the plan and also allows for optimization on new unknown parameters such as fracture orientation and horizontal spacing



Macondo - an industry response?

David Bamford
Consultant Editor, Digital Energy Journal



I have been somewhat reluctant to delve into the findings on the Macondo disaster as there is still more evidence, and more reports, to emerge but it does seem that one can say a few things.

My personal view is that there seems to be an industry problem, at least as far as three aspects are concerned namely training, BOPs (and cement jobs) and communications, and I want to make the case that we need to find technology solutions to these (as well as improving internal processes, setting new standards and so on).

Firstly, training:

I have heard it said that some deepwater rigs and deepwater wells are sufficiently complex that it is tough for anybody to fully comprehend what is happening and respond quickly enough when something comes wrong. I am struck by the analogue with flying a modern military fast jet (those of you who know me well will know I have a family interest in this subject!) and by the extraordinary amount of time that pilots spend training, especially in simulators – simulators that can replicate more or less every eventuality that a pilot may face in flight and in combat. Isn't there a case for such intensive simulator-based training in our industry?

Secondly, BOPs:

Our industry has used the BOP as the ultimate fail-safe device for a number of years – to pursue my military jet analogue once more, it has been like the ejector seat!

From what I can tell from the reports I have read:

1. The Deepwater Horizon BOP's emergency mode did not seal the well. Three methods for operating the BOP failed – the emergency disconnect sequence from the rig; the automatic function mode; the remotely operated vehicle (ROV) intervention. The latter likely resulted in closing the BOP's blind shear ram (BSR) but this failed to seal the well, probably because the BSR was unable to cut the piping wedged in the BOP.

2. BOP failures are not unknown. Indeed, in 2005, an analysis of incidents in the Gulf of Mexico by researchers from Texas A&M University showed that offshore blowouts had continued at 'a fairly stable rate' since 1960 despite the use of BOPs. In 2000, a US MMS notice said that the MMS considered a backup BOP actuation system to be an essential component of a deepwater drilling system and therefore expected OCS operators to have reliable backup systems for actuating the BOP. However, the MMS left it up to the companies involved to decide what sort of backup system to have.

3. Regulators in Norway and Brazil require drillers to use a remote-control shutoff called an acoustic switch as a backup system. However, in 2003, an MMS report said that acoustic systems could not be recommended because they tend to be very costly and because there is insufficient data available on their reliability in the presence of a mud or gas plume. Note that, in the Deepwater Horizon case, although the acoustic trigger could have activated the BSRs days earlier than the ROV, this would not have helped if the BSRs were indeed unable to cut the metal that was wedged in the BOP.

4. In my humble opinion, regulators should draw a couple of lessons from this:

- Drilling contractors should be required to demonstrate that their BOP BSRs can cut any reasonable amount and quality of metal that sits inside the BOP.

- Following the example of Norway and Brazil, it should be required that all BOPs are fitted with an acoustic trigger. Manufacturers of acoustic devices should be required to demonstrate that their equipment will work at all depths and under all conditions.

- Obviously, contractors will require time to implement these requirements, perhaps 2 -3 years would be appropriate?


Incidentally, there seems to be a substantial growth opportunity out there for these latter manufacturers, Kongsberg and Nautronix for example, with several hundred BOPs to equip!

My limited understanding of cement jobs leaves me with the impression that these can fail or partially fail more often than we would like despite sophisticated chemistry and the use of down-hole technologies that have advanced beyond the original cement bond log, and that this may be an issue of quality control rather than new technology per se.

Finally, we may need to introduce a step-change in communications and information flow between onshore 'command centres' and drilling rigs (and indeed any remote installation) as many things came down to people not knowing the right information at the right time. This implies getting better data to begin with, having systems to clean up data and make it easy to understand, systems to make information easier to work with, for example more precise alarm systems, so that all available expertise can be brought to bear on remote operations, especially in anticipating and dealing with problems – NASA's Houston Mission Control and Apollo 13 come to mind!

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Leaders

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Exploration

Data management important when choosing software - Paradigm

When choosing your geological and geophysical software, it is important to bear in mind how good the data management tools that software company provides are, says Paradigm’s vice president of marketing Philip Neri

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Fugro – new version of Seismic data management software

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SAS – statistical analysis to get better data

SAS, a US analytics software and services company, is working with many oil companies around the world using statistical analytics techniques to help them improve their data

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Geofacets – search Elsevier articles for maps

Science publisher Elsevier has put together an online tool called Geofacets, which enables users to find Elsevier geological maps by geographical search

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Schlumberger’s new version of Merak Peep

Schlumberger has released a new version of Merak Peep, its software for economics, planning and reserves management in oil and gas. By Rick Lobrecht, product champion, Schlumberger

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Landmark’s field planning software – new version for shale gas

Landmark Software and Services, a division of Halliburton, has introduced a new version of its Collaborative Well Planning software, specifically designed for shale gas, or fields where there will be a large volume of wells

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ATCE panel: why slow take-up of IO?

Based on past data, adding integrated operations to an oilfield project adds about 20 per cent to its net present value, says Pieter Kapteijn, director of technology and innovation at Maersk Oil, at an ATCE panel session. So why aren’t we doing more of it?

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Should standards bodies interoperate?

It might be time for work to make the various oil and gas industry standards interoperate better, said speakers from Chevron and ExxonMobil at the ATCE event in Florence

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Baker Hughes expands reservoir services

Oil service giant Baker Hughes is expanding its reservoir-related offering, beyond just drilling, in a move to offer its customers services over the lifetime of the field

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NOV’s system for rig equipment tracking

Drilling company NOV has developed a software tool for tracking rig equipment and maintenance, and helping companies continually improve their maintenance, using handheld computers. By Kashif Mahmood, NOV M/D Totco, Houston

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Digital oilfield: what is really involved?

Implementing digital oilfield means a lot more than technical implementation of apps, writes Dutch Holland of Holland Management Coaching

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Managing your alarms

We’ve all heard stories about offshore drilling rigs and production platforms where people had so many alarms going off they kept them all disabled. What can be done about it? We spoke to Don Shafer, chief technology and chief safety officer at Houston consultancy Athens Group

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Drilling data on your cellphone

smartreasons LLC, a company based in Houston, Texas, has developed technologies which can enable various levels of an organization to track relevant real time information and crucial KPI data, including on their cellphones

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Knowledge Reservoir alliance with Cimarron

Knowledge Reservoir, a geosciences consulting house based in Houston, has announced a ‘technical alliance’ with Cimarron Software Services, which manages real time data systems for NASA

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Chevron – using Nimbus Control software to manage processes

Chevron is rolling out Business Process Management (BPM) software “Nimbus Control” across the company – after Chevron’s shipping division had a good experience with the software

Chevron is gradually rolling out the Nimbus Control BPM software application around the company, following its successful deployment in Chevron’s shipping division.

Nimbus Control is used to help people manage their business processes – but it does it in a different way to most other process analysis or process automation software tools.

Rather than try to automate everything (i.e. give staff a sequence of screens to enter data, like when you book a plane ticket), the software aims to give the user the information they need to do their jobs.

So you can see it more like an intelligent operations manual – or a GPS for your business, so that staff can more easily and quickly follow approved procedures to accomplish their work tasks.

There are limits to how much the “automation” route can work when trying to use software to help people manage their work in the oil industry.

It isn’t possible to organise a company’s processes by some “central Wizard of Oz”, says Jim Boots, senior business process management advisor at Chevron, who was responsible for facilitating the growth of the Nimbus software in the company.

“In Chevron, most people aren’t going to do the same thing every day,” says Mr Boots.

“They come to their desk, turn on their computer, and then access the content which is meaningful to what they need to do.”

Mr Boots estimates that only 20 per cent of business processes in the oil and gas industry are actually automatable.

80 per cent of the processes have “manual” steps, where people go between phone calls, e-mail and software systems to get something done. Nimbus Control helps staff understand these process flows – providing ready access to the right information, work instructions and systems associated with any step.

For example, if someone working in a shipping company needs to send a tanker to the Arctic and they haven’t done that for 6 months, the software acts as the operations manual, to tell them what list of steps they need to follow, to make sure the vessel is appropriate for use and contracted under the

right terms and conditions.

The software is designed to help people do what they need to do in practice, so it’s more than just a training manual.

“You have to give the capability to the people. You put something in their hands so they can begin to own these processes. That’s the real key behind what Nimbus does,” Mr Boots says.

“It’s about combining the procedural steps and making sure the right version of the needed information is at people’s fingertips.”

“People can log in and say ‘how do I do something?’ Whatever it happens to be, we present them with the standard approved way of doing it,” explains Mr Swain, senior vice president, North America with Nimbus.

Nimbus’ corporate head office is in Hampshire, UK, with a US head office in San Francisco.

The software is used in many different industries, some of whom have over 130,000 people using it, rolling it out to their entire company.

Choosing Nimbus Control

“I’ve looked at a number of business process software tools,” says Chevron’s Jim Boots. “Other products are focussed on capture, analysis and automation. They are focussed on the automatable parts of processes. But that is not at all what Nimbus is trying to do.”

Mr Boots says that his number one reason for liking Nimbus Control is that it is “really focussed on empowering end users”.

“Once I got going with that – I realised how many good things we could do with this – in our environment.”

The first part of Chevron to use the Nimbus software was Chevron Shipping, the tanker operator, which was chartering vessels from offices in Singapore, London and the US, and was occasionally finding itself in tricky commercial situations, leading to additional liabilities, such as vessel arrivals and cargo readiness not being perfectly coordinated.

“They aren’t huge issues but together they add up to a lot of dollars,” he says. “So they said, we’ve got to get our heads around this. Somehow or another, it was a little bit

of a serendipitous connection, Chevron shipping got connected to Nimbus and started using the Control software – and I happened to find out about it.”

“I said, ‘Wow this is really good, this has enterprise potential.’ I set up an infrastructure to support the software, then I started showing it to people to build interest and more people started using it.”

“At the time Nimbus was significantly better than what we were using (to manage business processes) – which was Visio and PowerPoint,” he says. “People often call Nimbus ‘Visio on steroids.’”

Oil company processes

Oil company processes can be described at many levels.

For example, at a highest level, an oil company wants to decide where to explore and produce. At the next level, it decides how to do it, such as doing a seismic survey. Then there are levels where it works out how exactly the task will be put together, who will do what and what checks need to be done. When you come to the tasks which most people do day by day, you can be about 6 levels down into process decomposition, Chevron estimates.

The fundamental objectives of all companies are pretty much the same, but they all have different ways of achieving it, particularly in companies which have been through many acquisitions.

“Consumer banking for example, or insurance, is at the low end of complexity,” says Chevron’s Jim Boots. “That’s why fewer and fewer people are involved in banking. It is very automatable.”

“The airline industry is complicated but not as complicated as our business. With airlines it’s a relatively small set of procedures, but it’s more complicated than banking.”

“Our industry is out there at the other extreme – highly complex, global supply chain, physical products in very different environments. And there can be a heavy price to pay, if things go wrong,” he says.

The Deepwater Horizon case is a good example to use here, because many people are familiar with it.

The personnel involved were not doing a task which they perform the same way

every day, or even every month, so it would not be practical to reduce it to a series of on-line forms saying this is your next step.

But just from reading the investigation reports, you get a sense that it was not clear who was responsible for which decisions or which processes, which choices were within acceptable limits for the company and when specific decisions were taken.

If the processes had been properly documented, understood and followed, it would have been helpful to keep everybody on track. And that's where a business process management tool like Nimbus Control earns its keep, because the processes are more robustly managed and you can trust that they are up-to-date and subject to regular audit.

Helping people do the right things at the right time

What the software does, you could say, is provide a level of support and guidance. But since 80% of work tasks in most businesses are manual or only semi-automated, the fact is that people always have free will. You cannot reduce everything to the simplicity and certainty of form filling and button clicking. The content people create with a tool like Nimbus Control respects this reality.

For example, when a decision needs to be made, the software can suggest to the user, "now you have to evaluate these factors and use some judgement," rather than try to tell them what the answer is.

The software might say, "Here's an unusual procedure – the right thing to do here is to have a conversation with an expert – a

real one," Mr Boots says.

"Some pieces of those procedures could be automated in the sense that unless you acknowledge a certain step has taken place – you can't go to the next step," Mr Boots says.

"M" is for Management

BPM is not just a matter of documenting your processes. The "M" stands for Management after all. You need to be confident that processes are approved, up-to-date and regularly reviewed. In highly regulated industries you're going to need to overlay the compliance requirements on-top of the process, and use that to drive compliance audits. You may need to show where business controls and safety checks apply to the process, and show that the controls are regularly tested and certified.

There's more to this than initially strikes the eye. One of the clever things about Nimbus Control is that due to personalized delivery of information to users, you can keep the content easy to access and understand for ordinary staff who don't need to use the more powerful aspects like audit and compliance.

Also, people don't need to be at their PCs to work with the software. "The software can give that information graphically, real time, on a handheld device if that's necessary, which is important if you've got a mobile workforce," Mr Boots says.

A company standard?

Any company with several business units has to figure out how much it will dictate the

way things are done from head office and ask all employees to do it that way, or give employees in different divisions the latitude to do things their own way.

But sooner or later in a company's growth there comes a point when if you want to improve efficiency, safety, quality and customer service it pays to have an agreed method for how various tasks should be done. Once those methods are adopted by the workforce you've got a chance of starting to improve performance. And that can be very empowering for employees, as their opinions about what should be changed suddenly really matter. Let's face it, if everyone works differently, there's no point in head office listening to improvement ideas. What works for one person will be inappropriate to another. But once there's an established best practice, ideas for improving that still further really matter, and if the improvement works, the effect can be multiplied thousands of times by other colleagues.

"All companies are faced with these challenges," Mr Boots says. "and software isn't ever the total answer. At the end of the day it's people which count and the way in which they adopt processes and want to be involved in improving how the company operates. Providing our employees with a consistent place to look for process and procedure guidance, and keeping the content easy to understand has really helped in this quest. And since the software helps us collaborate together to improve the process still further it is really paying dividends in our quest for operational excellence."



Microsoft's Upstream Reference Architecture Initiative – 25 members

The Microsoft Upstream Reference Architecture Initiative now has 25 participating companies. We interviewed Microsoft's head of worldwide oil and gas, Ali Ferling, and other members of the team, about the latest developments

The Microsoft Upstream Reference Architecture Initiative, to develop a standard IT architecture for the oil and gas industry and encourage people to use it, now has 25 participating companies.

Companies signed up to the initiative as of September 2010 are Accenture, EMC Corp, Energistics, Esri, Honeywell, Idea Integration, IHS Inc, iStore, Infosys Technologies Ltd, ISS Group Pty, Landmark Graphics (Halliburton), Logica, Merrick Systems,

NeoFirma, NetApp, OpenSpirit, OSIsoft, Petris, PointCross, Schlumberger Information Solutions (SIS), Siemens Energy, Tata Consultancy Services, VRcontext LLC, WellPoint Systems Inc and Wipro Technologies.

The Microsoft Upstream Reference Architecture Initiative is developing an advisory board of people working at oil and gas companies.

The project aims to define broadly a

standard way that oil and gas information technology systems can be stitched together.

It suggests that oil and gas IT systems are built up in 5 layers - (i) databases, (ii) applications for different domains (eg production software, g+g software); (iii) systems to integrate all the applications together; (iv) "orchestration" to manage people's work using the applications, and (v) presenting the data, so people can work with it.

The architecture standard has a lot

more detail than this, describing ways to set up specific processes, for example to monitor production or manage geophysical data. But it does not specify specific products which should be used, or define things so tightly that only specific products will work with it. There is an emphasis on open standards.

If most companies put together their IT systems in the same way, it becomes easier for the industry to gather knowledge about the best way to do it; it also becomes easier to transfer expertise, software applications and other IT products from one company to another.

Microsoft embarked on the project because it was constantly being asked by its customers what they thought was the best way to connect the different software components together, says Paul Nguyen, industry technology strategist – worldwide oil and gas industry, Microsoft. So it designed the architecture to be able to provide a standard answer.

“We are driving a consensus how technology should be used,” says Dr Ali Ferling, managing director, worldwide oil and gas industry, Microsoft. “It’s about knitting things the easiest and simplest way together.”

Defining things loosely

It is important to understand that the standard architecture aims to define how IT systems should be stitched together fairly loosely – similar to how a recipe gives you steps to make a meal, or a standard architecture for a house might say, have the living rooms downstairs and the bedrooms upstairs.

The architecture does not specify which specific products should be used – and it is not a ploy to secretly force oil and gas companies to use products from certain suppliers.

One of the challenges with the standard architecture is combating the perception that the project is about promoting Microsoft products.

To continue with the house analogy, most houses are built in a standard fashion, with bedrooms upstairs, a hallway by the entrance, a kitchen next to



Microsoft was constantly being asked by its customers what they thought was the best way to connect the different software components together - Paul Nguyen, industry technology strategist – worldwide oil and gas industry, Microsoft

the dining room, a bathroom near the bedroom, a structure so you can go from one bedroom to the bathroom without going through another bedroom. It will have electric and plumbing systems built to certain standard sizes.

Doing things this way makes everything a lot easier – because electrical supplies have standard voltages, people can use the same electrical appliance in different houses. People can feel comfortable living in different houses, and so on. But at no point does any specific supplier gain any advantage.

The standard methods for building houses evolved over time, in different parts of the world – but now, most people around the world live in properties which are broadly similar.

Architectures, exchange standards and models

There are important differences between an IT architecture standard (which Microsoft is promoting), data exchange standards and data model standards.

Data exchange standards define standard ways data can be exchanged from one system to another, so different systems can be fitted together.

Data model standards describe standard ways of storing data (a bit like file formats).

Obstacles

One obstacle to getting oil and gas IT systems to work well together is the way the industry is set up, with many different vendors, all making solutions to specific problems, working in competition with each other.

The industry is often proud of the competitive environment between suppliers, “It thrives on competitive suppliers and competitive practises,” says Johan Nell, partner lead for Accenture upstream. “The industry is proud that it has the latest suppliers and the latest vendors.”

Oil companies want to maintain the flexibility to have ‘best of breed’ for software at any point in time.

But it also pays a cost, in that there is often very little incentive for suppliers to ensure their software works well with other company’s products.

“We have to move beyond these point solutions,” Mr Nell says. “We’re getting to the point where we need to integrate more of these technologies. Microsoft is making it easier to do.”

It would be ideal to reach a situation where somebody could take a software component from one vendor (eg Halliburton), and replace it with a component from another vendor (eg Schlumberger) and it could

work straight away, he says.

Many people in the industry support the broad idea of better integration between IT products. In a recent survey of upstream oil and gas professionals conducted by Microsoft and Accenture, “a third of respondents to the survey said they’d like vendors to collaborate more,” Mr Nell says.

But there are not many people with the specific role of achieving this and many people who want to protect their ability to use software which helps them do their job, which they know how to use.

“Geology and geophysics engineers roll their eyes because they are most interested in solving their own unique challenge,” says Mr Nell.

“But we say, you’ve got to make it easier to solve the whole challenge, to integrate the information and expose it to the whole of your business, and make it easier to visualise data.

It is not unusual for an industry (or even a society) to be stuck with many different components which don’t fit well together and not many people having the incentive or ability to bring it all together. Mr Ferling quotes an expression from his country, Germany. “Germans say, god made all things – and the devil made the things between the things,” he says.

Building on the architecture

There are other aspects which would also benefit from standardisation – including standard terminology, standard translations between terminology in different languages. And if someone would develop such a standard, it could be included as part of this standard architecture.

There are many elements which could be added to the architecture but are not compulsory – for example using cloud services rather than software + databases for the applications, and using social networking tools for the presentation layer.

It has flexibility to be continuously developed for new technology developments or trends – it just provides the main building blocks.



“We are driving a consensus how technology is used” - Ali Ferling, head of oil and gas, Microsoft

Energistics – developments in oil and gas data standards

Energistics will release a new version of WITSML, its data exchange standard for drilling, by the end of the year. We interviewed CEO Randy Clark about the future of data standards, preventing deep-sea disasters, and how the organisation keeps people involved

Energistics, the data exchange standards organisation based in Houston, an upstream consortium of oil operators, service companies, software providers and regulatory agencies, will release a new version of WITSML, one of its most important standards.

WITSML is a standard for exchange of data about drilling, completions and, now, fracturing. It is used for communicating real time and near real time data, as well as for data archiving. It is used by operators, drilling companies and a number of regulatory agencies – including the UK and Norwegian governments.

Data exchange standards mean that the software systems of all the different companies involved – drilling company, operators (including joint venture partners), other contractors and regulators – can easily exchange data in the same format and structure.

Most of the world's international oil companies, and many independent oil companies and national oil companies, are members of Energistics. There are about 40-50 commercial products available which use WITSML, Mr Clark estimates.

If the standard wasn't there, programmers would need to be brought in to write interfaces individually between all of the different systems, and rewrite them every time the software systems are upgraded, and there would be a high risk of a problem due to an interfacing error which nobody knew about.

"You're basically back to having rooms full of developers building one off connections between applications," Mr Clark says.

But if everybody agrees to make systems compatible with a standard, all the systems can be plugged in and communicate straight away, the way your computer mouse can communicate with your PC.

With more people involved in the standard, there is more money available for extensive testing, so more problems can be discovered and removed during the testing phase.

Having a standard means that it is easier to provide people with the best possible data – which might enable people to spot conditions which could be leading to an accident, or inefficient operations.

WITSML 1.4.1

By January 2011, Energistics will release version 1.4.1 of WITSML, the data exchange standard for drilling and completions.

Version 1.4.1 resolves two technical problems with the previous version, and has two new objects, including one for well stimulation.

The standard is currently in "review" status, which means it is at a stage of maturity for people to try it out, but not yet to use operationally. The current recommended standard for operational use is the previous version, 1.3.1.

Version 1.4.1 is much tighter than previous versions, in declaring what must be done.

Making tightly defined standards means that users are less likely to encounter problems from one system not communicating well with another one.

"That's been one of the stated problems of WITSML in the past – it was a little too flexible and allowed for implementation in a number of different ways that created what the community called dialects of WITSML. That created some problems for interoperability," Mr Clark says.

The new version "is more specific as to format, data content, architecture – it allows for fewer dialects," he says.

There will be a certification process, where companies' WITSML installations can be tested by another organisation, to certify how precisely the standard has been followed.

Energistics' WITSML groups have put together a test software tool, which can check how much a certain data set is in compliance with WITSML. "We've already had several vendors pass test suite number 1," Mr Clark says.

It will be possible for 3rd party organisations, or Energistics committees, to test whether or not a piece of software is WITSML compliant, build tools and issue certificates. Until now, companies just certified themselves.

3rd party certification is important because it forces companies to go that little bit further. It takes a great deal more effort to be 99.9 per cent compliant to a standard than 99 per cent compliant – companies could be tempted to declare themselves certified when

they get to 99 per cent – but it is in that last 1 per cent that all the problems arise.

Oil companies driving

One of the most critical things with getting the standards rolled out is encouraging oil companies to take a driving seat role.

"At the end of the day it's going to be the operating companies which set the tone – in terms of compliance with the standards."

"Getting solid well communicated commitments to implement these standards is something that we struggle with," he says.

Now 3rd party certification services are available, oil companies need to just simply demand that any software products they use must be certified by a third party to be WITSML compliant, and then they know it will work.

"We hope that in the future, that requirement to be WITSML compliant will encourage vendors to go ahead and have their products certified – it's a potential marketing advantage," Mr Clark says.

Energistics would like to see more National Oil Companies involved. "By most people's estimates they control most of the world's hydrocarbon reserves now – they are by definition a major player – we really do need their input into the development of standards," he says.

"We have a very concerted effort afoot, to reach out to NOCs, to encourage them to participate with us in the development of these standards. In particular we're trying to gain the participation of some Chinese operating companies," he says.



At the end of the day it's going to be the operating companies which set the tone - Randy Clark, CEO, Energistics

Time scale challenges

One of the biggest challenges with rolling out new standards is the long time scales involved.

Oil companies have cycles for purchasing new software systems; developers have different cycles for developing and upgrading products; and Energistics has a cycle for releasing a new version of the standards.

So for a new standard to be in a version of the product in use at an oil company can take a while.

"Sometimes it can take a few years before products and people's ability to utilise them come into alignment with each other," Mr Clark says.

There is also another problem with timescales. Oil and gas industry people are frequently moved into different job positions and roles. This can mean that someone who had a critical role in getting a standard developed and used is no longer able to fulfil that role.

"Sometimes we find that we lose our champions inside some of these organisations and there are times when that creates a problem," Mr Clark says. "We've got to get someone else up to speed – there could be a little bit of lag time."

With the long time to get standards rolled out, and the speed with which people change positions, you have a third problem – that it can be hard motivating someone to drive the use of a standard, when they know they can expect to be in a very different role by the time the standard provides any benefits.

Road map

Energistics writes a "road map" for all of its standards, which state what kind of functionality the different standards will have and a plan for updates.

"It's like any normal product development company – where they have planned releases out into the future," he says.

When committing to use a standard with different versions available, there can be a dilemma. Should you use an older version which you know works robustly and has all the bugs ironed out? Or should you use a newer version which you can potentially do a lot more with?

There's no obvious answer to that question, but by publishing a timetable people have a better idea about where they stand.

"It gives the developers an idea of how long the current version is planned to be in place and when new versions will be released, and what types of features and functions will be associated with that release," he says.

Oil and gas companies can also keep the schedule in mind when planning their purchasing cycle.

It is very important to keep updating the

standards. Apart from finding and resolving problems, it provides a way to change the standard because it has ended up being used in different ways to how it was originally envisaged.

For example, for WITSML, out of the 27 or so objects which were originally developed, only 6-8 of them are now in widespread use. "The only thing we can surmise is that the community sees those as being of the highest value," Mr Clark says.

"There is some work being done to go back and look at some of the objects which are not in widespread use."

Deepwater Horizon

Energistics is embarking on a project to look at ways that data standards could reduce the risk of future disasters. "The recent Gulf of Mexico situation could be used as a springboard to develop additional standards," Mr Clark says.

Standards could be developed which could help provide people with better warning of something going wrong, increase access to operational information, provide better continuous data archiving which could lead to better information being available after the event happened, and also provide a means to ensure people follow regulation.

"We're very keen and we think that we've got potentially some government interest in taking a look at some of these potential industry standards," he says. "That's going to be a topic at our next board of directors meeting, and I suspect we will set up some sort of exploratory committee. We will be looking at it in the latter part of this year and the first part of next year."

The UK government has already shown interest in the project, and the Energistics is establishing the right contacts at the US Department of Energy to get them involved, Mr Clark says.

RESQML

Another Energistics project is building a standard for reservoir models data exchange called RESQML.

It is "getting a lot of market attention out there," Mr Clark says.

The standard could be used to exchange reservoir models between company geophysics departments, and also to enable the input of real time drilling and production data into reservoir models so they can be continually optimised.

"Historically – most of what's been used has been static reservoir models – which have been periodically updated with new information," Mr Clark says.

"The RESQML folks are building the capability to do dynamic models – they see

that as a tremendous benefit."

Work and rewards

The Energistics standards are completely open, non proprietary and without fee – anybody can benefit from them.

"We are taking a look at potential alternative operating models," Mr Clark says. "There's always the question of whether or not we restrict the usage of the standards to members only, or charge a fee for access to the standards."

To date however, the Energistics board has always rejected the idea that people should pay to use the standards. "Our board has consistently decided that it's not where we want to be," he says.

"As we look around the standards landscape, we decide that more and more companies are not happy with the idea of paying for standards and the use of standards."

This operating model can mean that it is more challenging convincing people to do the work of developing the standards, if their company does not get many direct benefits.

However there are many indirect benefits. "Participating in the early development of standards has proven to be beneficial from a market standpoint," Mr Clark says. "They can be potentially the first to gain value from the implementation of standards, They can also be thought leaders in the development. There are also very significant networking and business intelligence effects."

Companies sponsoring their employees to work on the standards can also have more influence in driving the standards to make sure they provide them with the most benefit.

Most of the people who work on the standards also have a strong passion and enthusiasm for better integration of software, and how it can make the oil and gas industry safer and run more effectively, Mr Clark says.

Energistics staff

The role of the Energistics executive staff is to "provide stimulus, thought leadership, marketing, promotion, awareness and overall shepherding of the work," he says.

"We make sure things stay on track, and that the right people stay involved, and there's a road map which the community can have confidence in."

"We're also harvesting case studies and success stories so we can help promote the value of the standards, and gain additional participation."

"We have a very multipronged role in all of this – which mainly centres around doing everything possible to make sure these standards can get successfully developed, adopted and maintained – to such an intent that they are bring value to the industry."

The success of today's E&P business largely depends on well established processes and the ability to access valuable information. Energistics' commitment to the development and deployment of open data exchange standards is essential in helping E&P companies deliver integrated IM solutions through collaborative efforts, thus enabling the upstream industry to achieve increased efficiency.

Mr. D. K. Pande, Director (Exploration)
Oil and Natural Gas Corporation (ONGC)



Data management important when choosing software - Paradigm

When choosing your geological and geophysical software, it is important to assess the capabilities of the data management infrastructure on which the software is built, says Paradigm's vice president of marketing Philip Neri

When choosing exploration – production software, customers carefully evaluate how well it performs geophysical and geological work, such as geological modelling, seismic imaging, seismic characterization, petrophysics analysis, says Philip Neri, vice president of marketing at oil and gas software company Paradigm.

Unfortunately, it is less common to allocate the same level of analysis and tests regarding the way the underlying data is managed in real-life scenarios involving group work, shared assets and other common situations. Yet it is the data management layer that will help companies keep track of what they have, migrate data to new file formats, and migrate information from one software company to another.

The data and user infrastructure is a long-term commitment for a company, involving training the staff, adjusting network topologies, storage resources and servers to the requirements of a particular architecture, and the formatting of all active data in the vendor's specific formats. This creates a significant barrier to change, and companies approach data infrastructure changes with extreme caution.

"I've never heard anyone say the data management is not good enough lets change the applications," Mr Neri says. "In an industry where it is always the need for improved prime technology that makes companies look around for alternative vendors, concerns about the modernity of the data infrastructure will be factored into an evaluation in the context of a refresh of a large percentage of the application portfolio."

Paradigm has been steadily building and refining its data management tools over the past few years. Its core data integration and management system, "Epos", runs on over 3,000 servers and is used by over 10,000 people, even if they are not directly aware of it because they are mainly focusing on the software applications they use for their interpretations.

"We've been in data management ever since we took the decision to move from providing just technology that bolts onto other people's systems to providing a full solution to our customers – that includes managing

the data," Mr Neri says. "We've developed an original approach to the subject, tailored to the needs of the data we manage."

There are three important components to a data management system – the physical data storage infrastructure (how it is stored and moved about the company); the file system and its formats (how data is organized and updated to new file formats when the software is upgraded, and the indexing of the data, so people can find the data they want..

Transitioning a company's data store from one E&P software provider to Paradigm can take anything from a few weeks for a small company to over a year for a large global organization. The staff will have to use both software systems simultaneously during the transition, which implies an ability for the different systems to interoperate as well as facilitate data transfer..

Data storage infrastructure

The challenges of data storage have changed a great deal, as hard disk data storage costs have plummeted.

"Some companies say why bother with tapes. The volumes of data have become so oppressive that the effort of putting it on a tape has become very demanding," Mr Neri says. "The disks are so cheap and rates of failure so low we can afford to keep everything online."

In the era of tape, companies needed to have complex management procedures, such as having a physical tape delivered to their desk out of the company archive, and loaded onto their workstation, and tapes returned to a storage room at the end of it. Robotic tape management has taken some of the sweat out of the process, but it may no longer be the right approach to the problem of long-duration archiving

With everything is stored on disks, you can make all of your data visible, and therefore available, to everyone. This does not imply that such data would be immediately useable for interactive work; large data files will be easier to work on if they are stored on your local computer network, rather than being accessed, but intelligent data re-localization tools can address such issues.

Now the only definition is "current" or

"less current", he said – and less current data might be located on a storage system which is further away, with somewhat slower access to it.



File formats

The database structure for all data apart from seismic

and wells, such as interpretation data, is based on an SQLite relational engine. "This is where the intellectual capital of the customer is being applied," he says.

Another structure is used for wells. "Well data is smaller than seismic but infinitely more complex," he says. "We have an optimized structure for well data."

Seismic data is stored differently. "Seismic data consists in a relatively small number of very, very large files which don't change. A seismic cube is something you read, it's not something you're writing very often," Mr Neri says.

You should move seismic files to as close as possible to the servers which are actually working on it, and move them around overnight by file transfer or by physical data storage device if the localization of activity in their usage changes.

Paradigm, like most software companies, releases a new version of its software approximately every 2 years, and new software versions normally have new file formats or additional information in file headers, which means that older versions need to be updated. If data is all online, or accessible over the network, then it can be automatically upgraded every time the software is upgraded.

Companies should consider how good a software company's data management tools are, when evaluating geophysical software - Philip Neri, VP marketing, Paradigm

Data indexing

You still need an organized system that ensures that data is carefully archived at certain points along the process and properly labelled. Metadata is crucial to such a process, helping future identification and retrieval of dormant data.

Without a good data management system, people have a tendency to keep large data files on data servers forever, but for lack

of an organized process the company does not get all the value out of the data's presence.

Having a more flexible data structure makes it easier to view entire plays, rather than assets.

"You have to zoom out and take a big look at a few thousands wells, a few thousand miles of surveys, generate regional maps," he says, "Link it all together and

come up with new ideas."

The use of web crawlers that can build a catalogue of all the available data over a global network, by systematically exploring all the accessible data, allows data administrators to have oversight of the data at hand, either through list or map-based data referencing. Because the search process happens offline, activity making use of the catalogue is not dependent on network bandwidth

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Fugro – new version of Seismic data management software

Fugro Data Management has released version 6.0 of its Trango Seismic data management software, with tools to track the history of data, and with integration with OpenSpirit

Fugro Data Management, the data management division of geosciences and survey company Fugro, has launched a new version of its Trango Seismic 6.0 tool for upstream seismic data management, which allows users to track the parentage or hierarchy of data files ("lineage") and has integration with OpenSpirit, so it can be used to manage data which is only stored in interpretation packages.

The company is planning similar upgrades in the fourth quarter of 2010 for its software package for well data, "Trango Well Manager", and its software for geological reports.

The lineage function provides the ability to see all the iterations of what's happened to a piece of data, says Leonard Hendricks, VP for Trango at Fugro Data Solutions (Canada).

"For example, if you've got the original field tapes from offshore seismic acquisitions shoots, then you can see someone did some preliminary work to create a prestack set of files. From there, there was work to create a stack file."

"Then maybe inversion was performed on it, or another post stack process was built on it. Or perhaps you have gravity or magnetic field data. There could be 2 or 3 different sets of processes."

The software will record what work was done, when it was done and where it is located, he says.

The system is useful if later work shows an error in the process and you want to retrace your steps. If you redo an earlier step, you want to know what files were generated out of the faulty data and make sure they are replaced.

Or maybe one aspect of the data will become more important in the future (for example if it is about a region where major finds have been made or seismic can no longer be shot) and you want to find the 'parent' data and work that data or project again.

OpenSpirit

The interface with OpenSpirit enables data to be managed within Trango which are stored within people's interpretation software. It doesn't matter which interpretation software they are using, as long as it is compatible with OpenSpirit.

OpenSpirit provides a range of tools to enable different geological and geophysical software packages to interoperate.

Many independent oil companies sometimes only have data in interpretation environments, by using Trango software with the Open Spirit interface they can access all of this data in other systems, and can copy available meta-data, trace outlines and data location into Trango.

Trango indexes all of the data (eg by project or survey name) through OpenSpirit to the interpretation files. This means that everybody in the company knows which interpretation projects exist around the company, what datasets have been loaded into them, and who is working on them.

The company is developing the same capability for its Well Manager tool to manage well data, where there will be a 'lineage system' – you can retrieve original logs, and then the interpreted logs after various pieces of processing work have been done.

Via integration with OpenSpirit, you can pull out metadata for the same wells from other software packages, or other software packages can pull data out from Trango via OpenSpirit.

Driving take-up

There are many factors driving an increased interest in data management systems for seismic data.

There is a growth of interest in 4D data (where people want to see how seismic data has changed over time). "A lot of the old files are becoming more important," he says.

Some companies developed data management systems in-house, and are finding that it might be a good time to bring in a commercial system, he says. Companies sometimes want a more formal data management tool as they get bigger that is commercially maintained with functionality input from many different E&P companies.

Sometimes companies only use public seismic data, and they think they don't need to bother having data management systems of their own, because they can always get the data from the public source whenever they need it. But then they realise that they are not tracking the work they are doing with the data and what value they are adding to it, and look for a tool like Trango, he says.

Mr Hendricks says that many companies consider a data management tool after they've been through an acquisition, for example as a way of organising the data of a company which has been acquired.

Many companies don't even have a master list of their seismic assets, he says. "We often find customers, the first output they're looking for, is a map of all the seismic assets they have."

Everybody has maps, of course, but not complete ones, which show everything you need to understand your company's seismic data – such as whether the data is licensed, proprietary, or the company only has rights to it for a period of time, or perhaps has exclusive rights for a period of time. "This information is not important in an interpretation package, and therefore not captured in that environment" he says.

But this information can be very useful for many people in the company – particularly if it gives the company a chance to sell licenses to, or trade data which they own but are not currently interested in, with data someone else has which would otherwise cost them a lot.

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SAS – statistical analysis to get better data

SAS, a US analytics software and services company, is working with many oil companies around the world using statistical analytics techniques to help them improve their data

Having good data is important in many aspects of the oil and gas industry, such as when you're trying to make the most out of seismic data, trying to get the most out of your reservoir, or trying to predict in advance when equipment will fail.

SAS is working on all of these projects, and many other ones for many different industries – such as looking for signatures in banking data which might indicate a fraud is taking place.

SAS is the largest privately held software company in the world, with over 11,000 employees. It is used at 93 of the top 100 Fortune companies. SAS is an acronym for "Statistical Analysis System", and the founder of the company has a statistics PhD.

The company does not sell a software tool as such, but more tries to find ways to implement statistical analysis as part of a company's data management architecture. SAS is actually a programming language, similar to FORTRAN and PASCAL.

"You analyse all the different parameters

and see what range of parameters for each variable has the most predictive power," says Keith Richard Holdaway, principal solutions architect for SAS Global Oil and Gas Management. "You can see which variables have the most potential influence."

It isn't usually possible to get quick evidence of the benefits the software provides – it can take several months.

Hardware reliability

The company has projects to try to improve the reliability of hardware, using statistical techniques to try to predict when components will fail.

It analyses historical data to look for "signatures" – particular things which could be seen in the data before important events occurred. Once this has been done, it can analyse real time data streams and try to predict when something might occur, by looking for the same signature.

In one project, Shell asked SAS to prove the value of the system, by providing produc-

tion data for a period of time before a part failure had occurred. The trick was to see if SAS could try to diagnose what was about to happen from looking at the data. Following the successful trial, Shell is now running models for SAS using real time data, Mr Holdaway says. Conoco Phillips is also a customer.

Reservoir

It can also be used for reservoir analytics, using data from cores and well logs.

"Say we're looking at improving recovery factor of a reservoir. We try to identify key reservoir properties that can give an indication of what are the most important properties of that reservoir," says Mr Holdaway.

Oil major TOTAL used the software in their mature fields to identify a plan to redevelop the field, he says. "They did some clustering analysis to try to identify wells with similar characteristics."

This means you can come up with a better plan for injection wells and infill wells.

Geofacets – search Elsevier articles for maps

Science publisher Elsevier has put together an online tool called Geofacets, which enables users to find Elsevier geological maps by geographical search

Science publisher Elsevier has developed a tool called Geofacets, which enables users to search geological maps published in Elsevier academic journals by searching on a map of the world.

The idea behind the tool is to enable users to find geographical maps and associated data that is embedded in journal articles, quickly and without fuss.

The service is designed for upstream oil and gas explorers, looking for new opportunities across the globe. The tool enables them to easily look through any academic research which might be relevant.

"Many people are not aware of the amount of academic information that's out there," says Friso Veenstra, director of Market Development oil and gas, with Elsevier Science and Technology.

"For example, we were showing this product to one of the big international oil companies. They were looking at a big area in Eastern Europe. They had searched for papers on our database, but they found 50 more geological maps using Geofacets.

"When looking around Lithuania – by searching traditionally they found 50 maps, but when we searched the borders of Lithuania on Geofacets we brought up 250 maps. By searching geographically the amount of maps increases tremendously."

"If you're interested in West Africa, you can see all the maps available in 31 of Elsevier's Earth Sciences journals," he says.

"Some clients have said, in certain periods when I'm looking at a new prospect – I spend 50 per cent of my time finding maps and georeferencing them," Mr Veenstra says.

If the geological maps are in map vector format as geotiff or kml, they can be downloaded into a geographic information system and superimposed on other maps and integrated with other proprietary data.

"You can layer data from different sources in your own system," he says. "If you are using ArcGIS – if you see a map of interest to you – you can grab it from Geofacets and put it on your software."

Elsevier has been working on building the

database for 18 months. All of the maps have been indexed by location, including lat/long, region, country and geological basin, as well as geological map type, map surface area and author keyword.

Academics and industry

Elsevier publishes a large number of earth science journals, with titles including chemical geology, deep sea research, engineering geology, flow measurement and instrumentation, Gondwana research, international journal of sediment research, Journal of African earth sciences, Journal of geochemical exploration, Journal of geodynamics, Journal of structural geology, Journal of natural gas science and Engineering, marine and petroleum geology, organic geochemistry, physics and chemistry of the earth, precambrian research, sedimentary geology, Palaeogeography, Palaeoclimatology, Palaeoecology and tectonophysics.

A lot of the papers are written about specific geological events, or geological structures and conditions, rather than specific regions.

New ideas for collaboration and the digital oilfield

Speakers from Oracle, Microsoft, Energistics, Landmark, Digital Oilfield Solutions, Epsis, Smart Reasons, Fuse Information Management suggest new pathways for collaboration and the digital oilfield - ensuring people have the information they need at the right time.

- > Standard IT architecture across the oil and gas industry
- > Extensive use of data exchange standards
- > Operators, service and equipment companies work together
- > Third party advisory on drilling activities
- > Drilling data streamed onto cellphones
- > Improved visualisations for field development planning
- > Improved visualisations for drilling and subsurface data
- > Vast and accessible master data management systems
- > Improved data infrastructure, including reliable downhole data and satellite communications

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Hossam Farid - Global Oil & Gas Industry Lead,
Oracle Corporation
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Jerry Hubbard - Chief Operating Officer
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Paul Nguyen - Industry Technology Strategist,
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Live demonstration - getting video streams onto your cellphone

Jane Wheelwright - Technical Application Specialist
Dynamic Graphics
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Matt Tatro - CEO
Smart Reasons
Communicating drilling data to cellphones using cloud computing

Ewan Whyte - Regional BDM for D&C Software
Landmark - Europe & Sub-Saharan Africa
Landmark (Halliburton)
New ways to use visualisation to help work with drilling data

David Holmes - Operations Director
FUSE Information Management
Making offshore - onshore integration work

Other Upcoming Finding Petroleum Events

- The 'capability crunch' in the oil & gas industry
Tuesday, November 23, 2010
The Geological Society
Free

- Advances in Seismic
Tuesday, January 25, 2011
The Geological Society
Free

- Exploring without drilling!
Tuesday, February 15, 2011
The Geological Society
Free

- Digital Oil Field - Smart Wells
Wednesday, March 16, 2011
The Geological Society
Free

- Deepwater drilling and production: ensuring people have the information they need
Wednesday, April 20, 2011
Inmarsat Conference Centre
£450

- Technologies for mature fields
Tuesday, June 14, 2011
The Geological Society
Free

Schlumberger's new version of Merak Peep

Schlumberger has released a new version of Merak Peep, its software for economics, planning and reserves management in oil and gas

By Rick Lobrecht, product champion, Schlumberger

This year, Schlumberger introduced Merak* 2010, its full-suite of economics, planning and reserves-management software for the oil and gas industry.

Designed to enable better exploration and production (E&P) business decisions, this latest release completely refreshes the Merak Peep economic evaluation and decline analysis application.

Incorporating input from a diverse group of clients, Merak Peep* 2010 delivers a standard economic analysis platform supported by 165 transparent fiscal models (see below for more on this).

The result is a significant updating of the Merak Peep core technology, with new power to calculate project economics anywhere in the world.

This new release enables engineers, geoscientists, economists and corporate planners to:

- Produce accurate economics forecasts using production projections, prices, capital costs and operating expenditures;
- Analyze economic results using indicators such as net present value, rate of return and before- and after-tax cash flow;
- Import production data from a variety of sources to forecast future production;
- Rapidly evaluate global assets, ensuring standardized economic evaluations companywide;
- Perform accurate reserves valuations using Merak Peep software integrated with the Merak VOLTS volume tracking and reporting system.

Personalised

Among the most significant enhancements is the new MyPeep user interface that features a modern look and feel and greatly enhanced analysis capabilities.

This new interface features a streamlined, clutter-free workspace with an appearance similar to Microsoft Office 2007.

Special features include a ribbon that provides easy access to Merak Peep functionality and a navigation pane styled to resemble Microsoft Office Outlook.

Using this modernized MyPeep interface, users—especially those who use the software less frequently than economist or planners—can quickly become accustomed to the software, enabling them to create a

personalized fit-for-purpose tool that makes economic evaluations simpler and faster with a lower chance for errors.

To further enhance the user experience, the MyPeep interface can even be tailored to support specific client roles. The results enable engineers and geoscientists to input data more efficiently while ensuring high-quality financial information for economists and planners.

Two mouse clicks from the Answer

With input from a large group of clients, the overall ease with which users can perform familiar tasks in Merak Peep 2010 has been greatly streamlined.

Previously, most tasks could take anywhere from three to eight mouse clicks and some might require even more.

For instance, building a hierarchy for fields, wells or cases could require multiple, time-consuming steps, dozens of mouse clicks and no portability when switching databases.

In Merak Peep 2010, a fully portable hierarchy can be built with two mouse clicks in a single screen, allowing users to switch databases without the drudgery of rebuilding the hierarchy.

Most key activities can be performed with the same, two mouse-click economy of effort.

Speed has also been significantly enhanced.

Numerous tasks, such as calculating capital costs can require updating parameters for a vast numbers of cases.

Opening each case and changing values manually is tedious, and using batch routines requires data to be laboriously recalculated.

With the new MyPeep interface, actions like these that could previously take hours to complete can now be performed in a matter of minutes.

Framework for plug-ins

A new framework for creating plug-in applications enables oil and gas companies to further improve and customize Merak Peep functionality.

This development framework allows easy creation of apps to extend Merak Peep that are specifically suited to the user's needs.



Helping you get answers about economics, planning and reserves management in 2 mouse clicks - Rick Lobrecht, product champion for Merak Peep, Schlumberger (photo courtesy of Schlumberger)

Plug-ins enable the creation of new buttons, menu items or other functions, that can be integrated into the Merak Peep ribbon to increase productivity or add unique capabilities applicable to a specific workflow or resource, for example heavy oil production.

This additional openness and integration can promote collaboration between asset teams, enabling planning workflows to expand horizontally across the enterprise. Helper panes can also be added that display in-context data and other user interface elements.

Because these new plug-in capabilities can be customized, they are able to address a company's unique challenges, helping to turn complex tasks into routine activities. Whether a user is implementing a time-saving workflow or integrating a proprietary forecast curtailment algorithm that has been developed internally, the possibilities are endless.

Fiscal Model Library

The significant evolution of fiscal regimes in E&P regions around the world makes the

Merak Fiscal Model Library (FML) especially valuable.

The FML provides more than 165 standardized fiscal models that give economists the ability to incorporate specific global fiscal regime information into economic analyses, so they can focus on analysis and decision-making rather than fiscal modeling. This facilitates an understanding of how operational changes will impact returns.

Custom fiscal model solutions are also available with quarterly updates of economic functions, documentation and utilities.

To complement the release of Merak Peep 2010, FML has been significantly extended. It now incorporates both United States and Canadian fiscal models. This extension enables these new stand-alone models to be updated more rapidly than was possible with previous releases. It also permits them to run alongside any other library models, using Merak Peep software.

Integrate with other workflows

Merak Peep 2010 can form the cornerstone of economics and planning when it is integrated with other Merak software applications. These applications include:

Merak Capital Planning* strategic portfolio management software. This analytical tool assesses oil and gas investment performance against key corporate economic and financial metrics, enabling dynamic portfolio management by modeling changes in technical and business constraints within today's fluid operations environment.

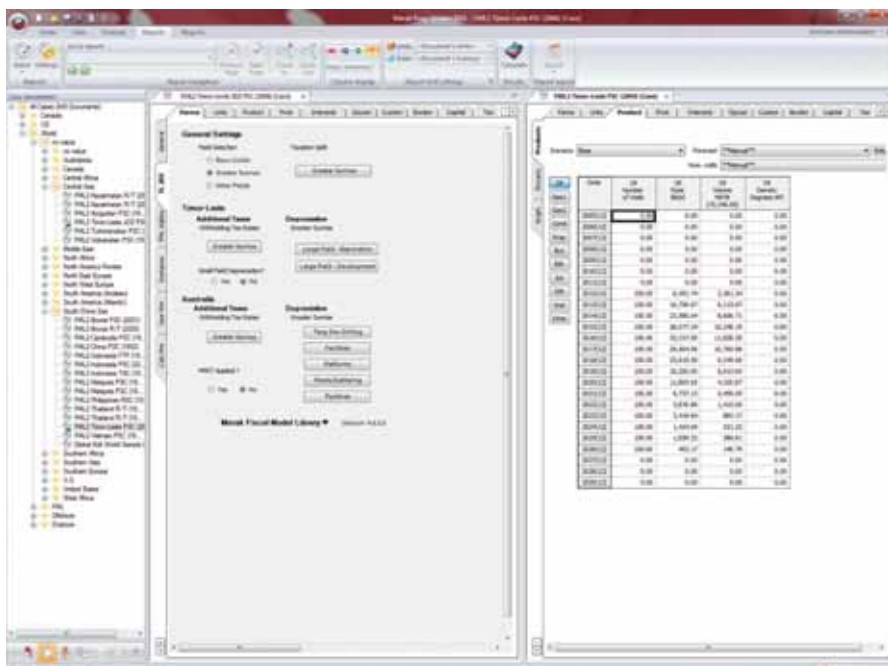
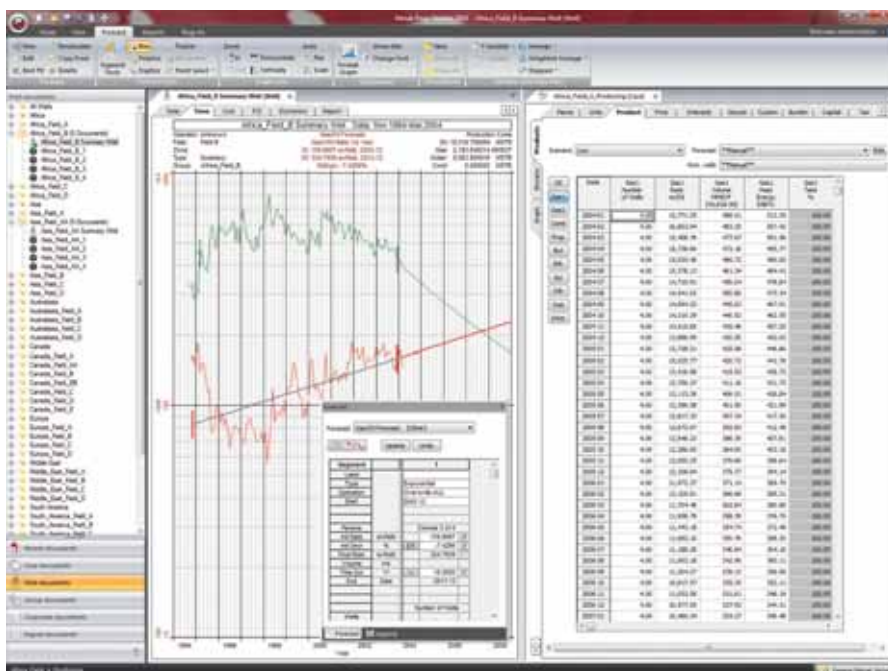
Merak Enterprise Planning dynamic business planning software. A complete enterprise solution based on standardized, commercially available technology, Merak Enterprise Planning provides a collaborative platform for oil and gas business applications, generating valuable planning information in context.

Merak VOLTS volume tracking and reporting system. Already implemented in more than 40 oil and gas companies worldwide, Merak VOLTS can provide a significant step toward a fully secure and auditable reserves tracking process.

Used together, these integrated software solutions enable seamless collaboration between different business systems and eliminate the risk of error during data reentry.

Moreover, they can be integrated with a wide range of other business systems, either to link inputs into Merak Peep cases or to share results throughout the enterprise.

These capabilities make Merak Peep and its supporting software a platform for collaboration across the asset team, business unit and corporate managers, enabling in-



Merak Peep software - make economic forecasts with production data (photo courtesy of Schlumberger)

formed decision-making with minimal effort.

With Merak Peep 2010, users now have a robust and efficient calculation engine that captures information in an open, accessible and object oriented format.

Merak Peep connects teams across the enterprise, enabling users to quickly update project data and better integrate with other business workflows. Its new plug-in capabilities permit the rapid incorporation of ideas

and workflows to address unique industry challenges as well as improving productivity.

Merak Peep 2010 offers fully transparent fiscal models, allowing for faster responses to legislative challenges.

The results are a full suite of best-in-class economics, planning and reserves management software that delivers economic standards based on the terms of the user.

*Mark of Schlumberger



Landmark's field planning software – new version for shale gas

Landmark Software and Services, a division of Halliburton, has introduced a new version of its Collaborative Well Planning software, specifically designed for shale gas, or fields where there will be a large volume of wells

The purpose of the software is to enable people to generate multiple development scenarios quickly, optimising a number of different factors, and enabling drilling, subsurface and surface teams to work closely together.

With shale gas wells, operators do not need to worry about dry wells so much – the certainty of hitting gas is usually around 95 per cent. But they do need very careful planning – because with overall drilling costs much higher than for conventional wells, good planning can make the difference between profit and loss.

In one view, the user can see the entire field on a screen in 3D, including the surface (and whatever features are on it, such as mountains, lakes and buildings), the reservoirs, the planned well paths and drill pads, and how much the proposed development will cost. They can then change different parameters to try to optimise everything.

According to Ewan Whyte, business development manager for Landmark's Drilling and Completions software for Europe and Sub-Saharan Africa, one client told them that the software could create a field development plan in a few minutes where as from previous experience this process took up to 2 years.

Shale gas fields need a lot more wells than conventional fields – and so more sophisticated planning is needed to ensure that maximum utility is made of the available resources.

The conventional field planning techniques, for when companies had a year to plan each well, aren't good enough. "We can't work on an unconventional field with a conventional approach," says Mr Whyte.

The ability to visualize the field development plan in 3D, whether they are involved in the surface or the subsurface planning, works to everyone's advantage.

Once the first couple of wells have been drilled, you can just give the plan to the drillers and ask them to get on with it, you don't even necessarily need a geologist at the wellsite. Everything can be monitored from the office.

"Previously geologists sometimes felt they were ignored as soon as the drilling plan was introduced," says Sarah Bassett, direc-

tor of marketing and commercialisation, Landmark Software and Services.

"Now it's one big happy family."

Landmark released in August its latest innovation – the DecisionSpace Desktop. The DecisionSpace Desktop is a unified workspace in which global teams may collaborate to evaluate and develop assets. The Collaborative Well Planning suite discussed above will be integrated into this unified workspace in Q1 of 2011. By doing so, asset teams can practice even greater collaboration by sharing interpretation, analysis, well plans, etc. with each other in the same workspace. In addition, the application has been designed to deliver a more intuitive, easy to use experience or High Science Simplified.

"People from different generations use software differently and have different expectations from it, so Landmark has created a product which everyone can use," Ms Bassett says. "It's something the next generation of professionals can use intuitively, as well as the seasoned experts," she says.

"It's a bit like a computer game. That's the kind of mindset we're seeing from engineers.

They believe they should not need to be trained on software," says Ms Bassett.

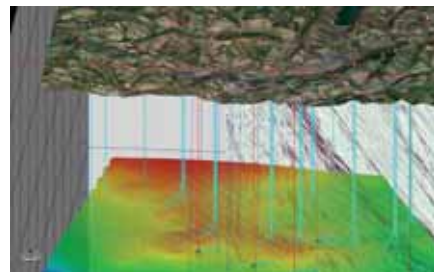
For people less comfortable with software, it has been designed to be as straightforward to use as possible, she says.

Optimising your plan

Putting together a typical drill plan will require taking many things into account, such as areas on the land where you can drill from, keeping the drill rig working efficiently and minimising overall drilling time, minimising fracturing costs, minimising overall drill length, and draining as much of the reservoir as possible.

On the surface there can be limitations on where a drill pad can be placed (urban areas or lakes), or areas where drilling might be more costly because of the ownership of the land in that location.

There can be other restrictions such as dogleg severity (the degree of bend a well can have), or the maximum production capacity from the field (based on the surface processing facilities which are planned).



Landmark's Collaborative Well Planning software allows users to plan wells in minutes instead of months, since the software enables visualization of the plan and also allows for optimization on new unknown parameters such as fracture orientation and horizontal spacing

You want to access as much of the reservoir as possible, but you know the fracture from each well will only extend so far into the rock. So you can specify how close you want the horizontal portions of the wells to be in the reservoir.

As the plan is developed, the software continually calculates what your cost will be.

Certain corners of the reservoir might be trickier to reach,

but any number of subsequent infill scenarios can rapidly be assessed to compare cost of drilling with production expectations.

You can try different placements for your drilling pads and see if it makes the overall development costs, or amount of reservoir to be drained, go up or down.

Once the first wells have been drilled, you might notice from the microseismic that the fracture seems to be propagating in a slightly different direction to the one anticipated, due to the stresses in the rock differing from expectation..

It is most efficient if the well direction is normal (90 degrees) to the direction of fracture (because then the most reservoir volume can be covered with the least number of wells). So you can adjust the well azimuth (well direction) and re-plan the entire field accordingly. The software will add up the new total costs.

The intuitive and visual nature of these tools promote collaborative workflows and the implementation of best practices across many disciplines.

ATCE panel: why slow take-up of IO?

Based on past data, adding integrated operations to an oilfield project adds about 20 per cent to its net present value, says Pieter Kapteijn, director of technology and innovation at Maersk Oil, at an ATCE panel session. So why aren't we doing more of it?

Based on past data, adding integrated operations to an oilfield project adds about 20 per cent to its net present value, says Pieter Kapteijn, director of technology and innovation at Maersk Oil.

He was speaking at one of the technical sessions at the Society of Petroleum Engineers Annual Technical Conference and Exhibition (ATCE) in Florence in September 2010, organised by the SPE Digital Energy Technical Section, and chaired by Philippe Flichy, CEO of IO-hub and Keith Killian, Programmatic Manager of Exxon-Mobil.

Less than 1 per cent of new wells drilled today are smart and at current growth rates, we will still only be having 15-20 per cent of wells 'smart' by 2030.

Mr Kapteijn says he has calculated that at a smart field project can have average production gains of 8-10 per cent, ultimate recovery gain of 5-8 per cent and reduced project risk, which, he calculates, amounts to a 20 per cent increase in net present value of a project. This calculation is based on published data from about 30 different projects.

"Going smart is at least 20 per cent better," he said. "It should be a no brainer, but maybe it is not."

One obstacle is the common perception that smart well implementations are unreliable – but these perceptions are wrong.

"If you ask experienced engineers how reliable smart wells are, they say, 70- 80 per cent. In fact it is better than 95 per cent. Why does this perception sustain?"

"People say: it is too complex and expensive. Actually: it may be complex but it's not all that difficult.

It is remarkably simple if you build it up from the bottom up."

"Still at the end of all of this, very few companies have programs in place to take this on as a strategic capability," he said. "Less than 1 per cent of new wells is smart (defining a smart well as one with sensing and controlling)."

"At this rate by 2030 we will have a penetration of 15-20 per cent. We're still extremely slow at picking this up – why is that?"

Many senior executives have been understandably cautious about smart well implementations for many years, demanding

that their value needs to be proven first. But now the value has been proven, the implementations are still very cautious.

"It is worrisome that after 10 years the industry hasn't decided what to call it – we have a bit of a communication problem," he said.

Incentives

Mr Kapteijn believes that one of the reasons for low take-up is because of the basis on which individual engineers in oil companies make decisions.

If a staff member installs some new technology which fails, he might be blamed by many people. But if the systems work, the credit is shared. In other words, by "championing" smart technology someone might feel they have more to lose than to gain.

"Everyone is watching the results. The personal costs can be higher if it doesn't work," he said.

"Leadership manages this by de-risking individual decisions," he said. "You have to create safe space to get this going and you do that as a leader by providing vision and commitment to a program.

"I don't want to sound cynical but I think we are being led by pre-digital leaders and we have to accept that," Mr Kapteijn said.

There is also far too much focus on the immediate short term benefits (how can you increase production by tomorrow), rather than the longer term benefits, which come more from having a better ability to predict what future production will be over the lifetime of the well and field.

"Smart wells give you a higher upside. You get better information earlier. The project risk profile going forwards is significantly different."

In most people's calculations of the value gained, the benefits of predictability (ie having better advance information of what is going to happen) is something that is not always considered, he said.

"The downsides are short term and very visible. The upside are long term and virtual."

The biggest benefits can come at the tertiary recovery stage of the well, when you have more information and more things you can do to increase recovery and extend well

lifetime. But tertiary recovery is not on people's minds when the well is being drilled.

"Getting most performance at a tertiary recovery level will require intelligence. This is where you create the big value. It is very cost effective, but also very hard to do – and we don't have all the tools yet."

Another obstacle is that, despite the benefits, there still isn't an obvious actual need for smart wells.

"My feeling is that the industry doesn't have a real need to do this yet. But not having these capabilities will severely handicap you going forward."

Collaboration

There are still plenty of resistance to collaborative working. "A lot of people are not happy to share their information," he said.

"There's a concern someone might be able to operate the asset from somewhere remote."

"These are not technical issues, they are cultural. Much of this stuff has nothing to do with petroleum engineering."

Stop talking big vision

Perhaps one culprit is grand talking about the future of the oilfield. "Maybe we should stop trying to communicate the big vision. We tried this and I don't think it worked," he said. "It is too complex and too long term for leadership to take on." Instead, "you can get to the IO vision step by step," he said.

"8 years ago, many of the devices you needed, such as for measurement and modelling, weren't there," he said. "They are here today. We're looking at solutions in Maersk and I'm struck by how cost effective they are. And you can find people who can



"Going smart... should be a no brainer, but maybe it is not." - Pieter Kapteijn, director of technology and innovation at Maersk Oil

advise you how to do this effectively.”

“Smartness is applying the right level of intelligence,” he said. “Some fields can work extremely well at lower levels of smartness.”

More data?

Kamel Bennaceur, worldwide technology manager for the integrated project management group at Schlumberger, asked if we are at the cusp of a revolution with all data having higher integrity.

Mr Kapteijn said that the objective is having the right data. “There’s a saying, too much data drives out information, too much information drives out wisdom,” he said. “There’s no end to information you can generate. You should work out the key decisions over the life of the field, and what is the minimum data set to be able to take that decision. Some companies are quite good at this analysis – they wipe out 80 per cent of real time data needs.”

Understanding everything

There was a question from a production engineer in the audience who said he did not understand people from the geology and geophysics world at all, and maybe this indicates the problem. “Do we need a new breed of engineer [who can understand everybody]?” he asked.

“I still think we need depth in discipline,” Mr Kapteijn said. “But we can give people depth and breadth to see the whole asset. You have to understand the impact of what you do on the whole asset. This broadening can start from day 1. Training at universities can be broadened out.”

It would be a bit much for oil companies to expect to have staff who know everything. “It takes about 10 years to master geology on a basin and come up with new ideas,” said Philippe Malzac, VP information systems with Total.

Long term vs. short term

There was a lively debate about whether national oil companies or integrated oil companies should be better at smart wells, triggered by a comment from Mr Kapteijn that the two companies which impressed him most on their attitude to smart fields are Statoil and Saudi Aramco. “They have long term views on this,” he said.

Michael Konopczynski, VP technology with Well Dynamics, suggested that maybe national oil companies could find themselves better at digital oilfield projects if they are more likely to have a longer term view.

Mr Kapteijn said he thought it was more about continuity in leadership vision – whether companies take a life-cycle view on

the development of the asset. “I believe NOCs tend to have more continuity in what they take on,” he said.

“Some NOCs are progressive, some are falling behind. I don’t have to give examples, some are quite obvious,” said Muhammad Saggaf, manager of Saudi Aramco’s EXPEC Advanced Research Center. “I think there’s a correlation between lifetime of the asset and how much you invest in it,” he said.

One delegate from ExxonMobil said “there’s probably not as much difference [between NOCs and IOCs in terms of their long term outlook] as you would expect. Most of the IOC resources we’re dealing with are very long term.”

Philippe Malzac, VP information systems with Total, said that “if the digital oilfield is really giving a competitive advantage, the IOCs should be first to implement it – the competition between IOCs is bigger than NOCs.”

Saudi Aramco

Muhammad Saggaf, manager of Saudi Aramco’s EXPEC Advanced Research Center, says he sees the main benefit of digital energy as ‘compression’ – trying to find out things and do things faster.

“You want to know immediately, or in minutes or days, that you are injecting too much,” he said. “So you have a proactive role rather than a reactive role.”

In the Khurais Field, (which is immediately adjacent to Ghawar, the world’s largest oil field), Saudi Aramco can see pressures changing in the field using sensors in the wells, and by doing so monitor the connectivity within the field. “We were able to do this even before a single drop of oil was produced,” he said.

A common mistake is for people to focus too much on the hardware, and not on the models which help you understand what the data is telling you and make decisions.

“Don’t bother installing controls at the well head, or Inflow Control Valves, if you don’t have a strategy for optimising the field. They will not help you.”

“Intelligent field is not a collection of gadgets,” he said. “It is a series and progression of different layers.”

“The most basic is of surveillance. Many organisations focus on this. This is not an easy layer by the way. But if you are stuck on this layer you are not reaping the benefits.”

“The next layer is systems to detect anomalies. This is where we are with Saudi Aramco.

In future, intelligent fields could become autonomous, he said. “The au-

tonomous field is a very intelligent field. This could almost completely marginalise the petroleum engineer.”

In order to get the full benefit, you need to have the right working culture. “It’s a different culture,” he said. “It emphasises collaboration and melting disciplines. I don’t see we are making efforts to do this,” he said.

“In the old days, field development was done sequentially”, he said. The work to develop the field was passed from one person to another, and backwards and forwards, for example if a reservoir engineer says he’s not happy with something and it needs to be done again. So it all took a large amount of time.

“Now everybody with a stake in the field is there at the same time,” he said. “You have to have that collaboration integrated work environment.”

“We have centres where the production engineer sits with the reservoir engineer and so on.”

Interdisciplinary interaction is the norm.”

To make collaboration rooms work well quickly, engineers need to be “plug and play,” he said. It should be possible to move an engineer from one job to another and they should be able to fit in straight away and work with everybody. “It is a requirement for a successful deployment.”

To help achieve this, Saudi Aramco is building a professional development centre, to start operations in October 2010. “It will turn young engineers into full participants,” he said.

It is not easy encouraging people to work together like this. “People are entrenched in their decisions,” he said. For example, they might say something like, who are you as a geologist to tell me that this reservoir engineering model is wrong.

The fact that most companies have discipline “families” can be an obstacle to cross-disciplinary integration. For example, the career of all reservoir engineers in a company is handled by the head reservoir engineer, who won’t necessarily care or know how well the reservoir engineer is getting on with geologists.

The answer is often more collaboration. “Once everybody is together and decisions are taken together, it removes a significant layer of conflict,” he said.

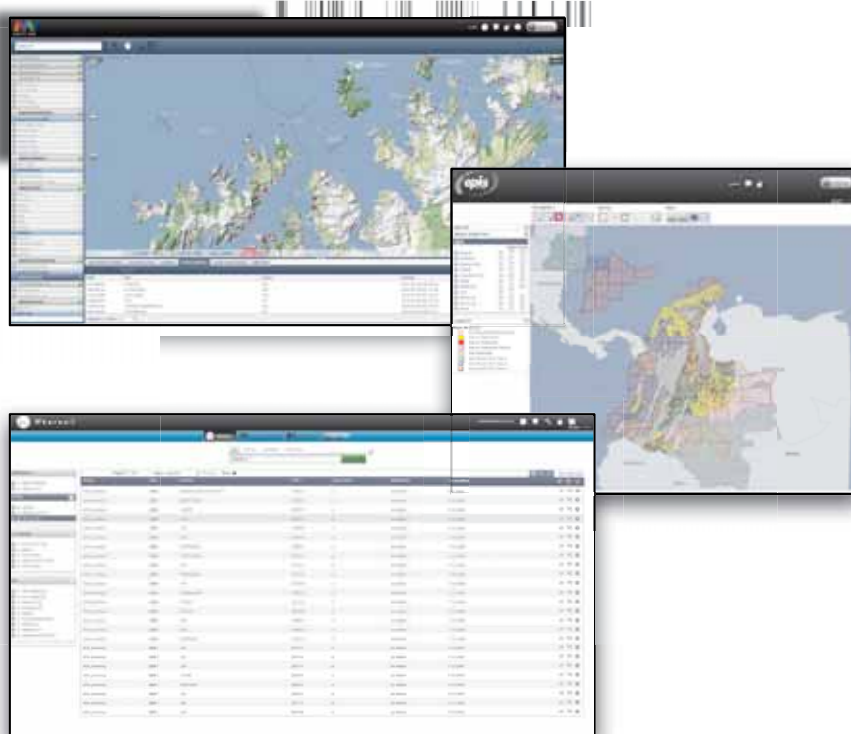
“You have to have a master plan, you can’t do it in bits and pieces,” said Mr Saggaf. “It has to be both top down and bottom up. Once you have these 2 elements things become much easier.

If you don’t have conviction at the bottom, you can achieve nothing.”

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K A D M E

Should standards bodies interoperate?

It might be time for work to make the various oil and gas industry standards interoperate better, said speakers from Chevron and ExxonMobil at the ATCE event in Florence

It might be time to work to make the various oil and gas industry standards interoperate better, said Rick Morneau. Manager - IT Strategic Research at Chevron, and Mark Crawford, advisor at ExxonMobil Technical Computing Company, speaking at a special session at the SPE Annual Technical Conference and Exhibition.

The paper is SPE 134107, presented at technical session "Digital Energy – technology and standards", Tuesday September 21st, ATCE Florence.

Standards "can help reduce exchange friction," Mr Morneau said. "I particularly like that definition."

But "if the standards bodies we have are competing, we have a higher level of friction."

"If we have some level of co-ordination between standards bodies, it should be smoother. If we had something like USB we should be able to jump forward."

"In trying to write any type of optimisation you have to work through many standards bodies," he said.

"We're starting to see some conflicting and duplication of data technology. If we want integrated operations, with cross functional workflows, this does matter. But integrated operations dictate integrated work processes."

"We're not talking about having one overarching standard."

"There isn't a lack of standards organisation or participation from upstream personnel of financial commitment."

"It may be time to rethink the best approach for industry standards. It's not a conclusion – but a consideration to be discussed."

"We don't want to start pointing fingers at different groups – eg WITSML and PRODML. We don't want to start pointing fingers at any individual group."

"The industry has to come together and say, what is the best way to address this."

"As it starts getting more complicated, you can't help but encroach on what others are doing."

"There can be generalised ignorance about what is out there," he said.

"What body is best [to co-ordinate the standards]? Since SPE is at the centre of it, it seems to be the right body."

Mark Crawford, advisor at ExxonMobil Technical Computing Company, who was a joint presenter of the paper, said "Rick and I both work on the PRODML special interest group. We've had integration aspects with WITSML and there's not something in place to help us work through that. We have to work with those groups. We've run into a number of issues."

"I think we all understand that the integration aspects – something we've talked about for nearly 20 years," said Mr Morneau. "Any of our companies have large investments in the current structure."

"We have to be proactive in how we address this so we're not discussing the same thing in 20 years."

Referring to the common joke about

standards (that everyone has one but no-one wants to use someone else's, like a toothbrush), Mr Morneau said "We have to take someone else's' toothbrush." – IE people will need to start using other people's standards.

There have already been dialogues started at Energistics about how to make standards work together, he said.

Neil McNaughton, editor of Oil IT Journal, commented that there are already efforts to integrate standards under ISO 15926 – and also IBM and Microsoft are aiming to develop frameworks, or standard architectures, which show how everything fits together. "They are implying that they already have a framework," Mr McNaughton said.

Chevron's Mr Morneau commented that he had been involved in the development of ISO 15926 – but there is still a discussion about what exactly it covers. The full definition of it is "Industrial automation systems and integration—Integration of life-cycle data for process plants including oil and gas production facilities".

"Where the facility domain starts and ends is not solved," Mr Morneau said.

ExxonMobil's Mr Crawford said that "ISO 15926 doesn't have the resource commitment to subsurface."

"As far as aligning with any vendor: definitely not," Mr Crawford said. "We want to make sure they are open interoperable standards."

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Baker Hughes expands reservoir services

Oil service giant Baker Hughes is expanding its reservoir-related offering, beyond just drilling, in a move to offer its customers services over the lifetime of the field

Oil service giant Baker Hughes is expanding its service offering related to the reservoir, through a number of acquisitions.

It recently acquired Meyer & Associates, a company which produces software for simulating hydraulic fractures in three dimensions.

The company also announced it has bought 100 percent of reservoir geological software company JOA Oil & Gas BV in October 2010, following an acquisition of 40 percent of the company in October 2009.

This follows the acquisition of Epic Consulting Services, a reservoir engineering consulting firm, and Helix RDS, a reservoir consulting services company, in 2009. In 2008, Baker Hughes acquired two reservoir consulting firms, GeoMechanics International (GMI) and Gaffney, Cline & Associates.

"Baker is traditionally not known for being in the reservoir area," says Derek Mathieson, president, products and technology, Baker Hughes. "We've been working on a number of acquisitions [in this area]."

"A few months ago we created a reservoir development services business segment. We have been building this capability within the company. We're not done yet with reser-

voir acquisitions."

Baker Hughes is developing this capability partly in response to changing demands from national oil company (NOC) customers.

"NOCs, compared with very large integrated companies, require a different skill set [from a service company]," Mr Mathieson says. "They want help on developing fields as well as on the execution part."

"Many of the acting drivers in service companies are in response to the needs of NOCs, who seek expertise on how best to develop fields and wells. Integrated oil companies (IOCs) generally don't need the same capability."

"We believe it will transform the whole business for us," he says.

However Baker Hughes will take care that it does not get into competition with IOCs – since NOCs often work with IOCs for their expertise, too. "Many of our customers are IOCs," he says. "There are some guard rails we want to stay within."

Baker Hughes is keen to have relationships with its customers over the entire lifecycle of the reservoir, not just the drilling part of it, says John D Harris, president, reservoir development services, with Baker Hughes.

It is also finding many new ways to create value from the companies it is working with.

"We are finding some amazing synergies in some of the companies we bring together," Mr Harris says. "The direction is an exciting one. We watch technical guys spark off each other."

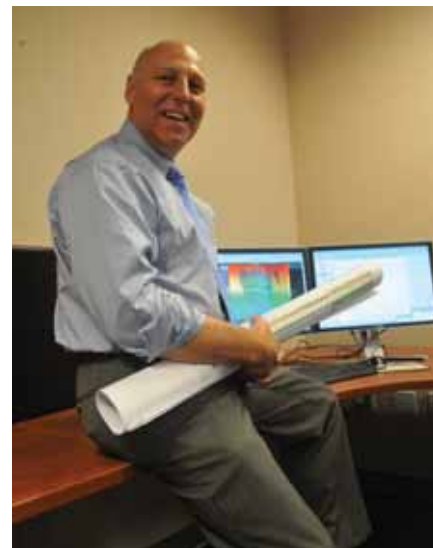
For example, by combining the frac stimulator with the JOA 3D modelling, you can model fracs in a 3D framework.

Shale gas

The company is seeing an increasing demand for its services for shale gas. "We've been migrating [the technology] from US land to other regions of the world," says Mr Mathieson.

"We all suspected it would be in Europe first – but Asia has moved more quickly than Europe. It will take a bit longer to bring the technology to Europe because of the regulation."

Meanwhile, "there's a swing to more oil-based play in the US," he says.



Baker Hughes is keen to have relationships with its customers over the entire lifecycle of the reservoir, not just the drilling part of it - John D Harris, president, reservoir development services, with Baker Hughes.

Meyer & Associates

Meyer & Associates, based in Natrona Heights, Pennsylvania, offers the MFract software tools which can be used to design fracturing simulation plans, such as for unconventional gas, tight formations in the deepwater Gulf of Mexico and carbonates in the Middle East.

Baker Hughes' RDS (Reservoir Development Services) group will work together with Meyer & Associates to integrate its MFract software with Baker Hughes' existing geomechanical and geomodelling software tools.

Baker Hughes will also use the software to expand its consulting and training business with hydraulic fracturing design and evaluation. It plans to offer a client training program on hydraulic fracturing design using the software.

"With this acquisition, we believe our reservoir and development consulting capabilities for low-permeability and unconventional reservoirs can now integrate the full range of field optimization services, including geomechanics, microseismic, multistage hydraulic fracturing, formation evaluation in shales, and pressure pumping," says Mr Harris.



"We're not done yet with reservoir acquisitions." - Derek Mathieson, president, products and technology, Baker Hughes

NOV's system for rig equipment tracking

Drilling company NOV has developed a software tool for tracking rig equipment and maintenance, and helping companies continually improve their maintenance, using handheld computers

By Kashif Mahmood, NOV M/D Totco, Houston (www.nov.com)

The oil and gas industry often struggles to manage the availability of its drilling equipment assets in far-flung, remote locations worldwide. Equipment asset tracking efforts are traditionally a dreary and manually-intensive process.

Even when documentation is eventually found, it does not follow equipment movement between drilling or storage locations, a shortcoming that caused companies to unnecessarily buy back-up equipment and tie up their capital.

Houston-based National Oilwell Varco has developed a system to help manage equipment, called RigMS.

RigMS lets users know instantly where a particular asset has been and who authorized transfers. The system also provides electronic documentation, ranging from warranties to bills of material, all web-accessible within a user-friendly tree-view. RFID tagging and bar coding of all customer requested assets make this possible via data management from a central database.

The aim is to make a previously bewildering task (a company finding its own assets) no more complicated than learning Microsoft Windows Explorer, on which the RigMS system is based.

RigMS users can locate any tagged asset worldwide via the web; find replacement parts; - manage expenditures better in real-time; enable Sarbanes Oxley compliance through immediate asset visibility; and view only information related to their craft or task, with each rig now broken out into zones based on divisions or equipment.

The software has sophisticated analytics which provide insights on how a company may maximize equipment availability, to help companies standardise and implement best practices across their fleets.

On a real-time basis worldwide, the system provides detailed operational reports, analysis and business recommendations. This allows drilling contractors to optimize utilization, drive costs lower and generally improve operational performance.

This approach provides operations personnel with maintenance management and custom reports; all are readily available through a Web interface. RigMS Analytics also include a continuous improvement program for updating procedures in response to field feedback.

Maintenance Management module

The Maintenance Management module, shows a web-based view of critical equipment maintenance information.

With its open architecture database, all documents relevant to each asset are compiled into a total maintenance profile for instant call-up on any Web browser anywhere.

The module also provides users with instructions on what to do and how to do it with short (2-3 minute) videos. Instead of complex screens crowded beyond comprehension with text, RigMS maintenance screens consist of simple information and step-by-step instructions.

From automatic maintenance scheduling to creating work orders, this system carries users through the process on each piece of equipment, displaying only information related to their specific needs.

The system also tracks the number of hours required for a worker to perform a particular maintenance task. Using this data, comparing and forecasting cost estimates can be charted in a corporate level report.

The system allows the actual maintenance experts (field level personnel) to suggest the most efficient intervals to perform certain work order steps, thereby maximizing both equipment and personnel availability.

After approximately six months of system usage, personnel can begin identifying best practices.

As an example, personnel can run comparative analyses to determine which cost centers are operating leaner than others.

Companies have discovered they can actually streamline maintenance and conduct certain procedures less frequently after analyzing trends and requirements defined to meet specific operational goals.

Additionally, in tracking and reporting, managers can compare asset performance records to make better decisions. Once operational performance information becomes visible, managers are then free to create and measure the benefit of new practices.

Strategic practice

In weighing the value-add of asset management, companies should consider four broad perspectives.

Companies need to continually improve maintenance practices for higher equipment availability.

Unfortunately, this need has historical-



Working with NOV's rig equipment management system, RigMS, on a handheld computer

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ly received more focus during disruptions and less during normal operations.

In direct contrast, turning equipment optimization into a strategic practice can transform asset management into a competitive edge.

From a drilling operator's perspective, utilizing an EAM (enterprise asset management) extends equipment lifecycles, which results in a direct impact on the company's bottom line.

At the same time, the system demonstrates a reduction in operational downtime and ensures regulatory compliance which is a significant issue.

With the industry increasingly subject to more regulation, attention to compliance is expected to increase, as illustrated by efforts to put BOPs under the microscope.

A second point is knowledge availability, whereby users have one hundred percent visibility of an asset's location, condition and maintenance history. With this knowledge, managers can take steps to improve asset utilization and cost management.

As an example, personnel can track the frequency of part replacement historically, allowing them to accurately predict stock quantities for the coming year (prevent overstocking).

Comparing data fleet-wide also provides a better picture of brand lifecycles, especially when Brand X is replaced twice as often as Brand Y. Essentially, knowledge availability opens the door to continuous maintenance improvement and better planning. Simultaneously, an audit trail is built, one which currently does not exist at many companies.

A third key point about the RigMS EAM (enterprise asset management) is its built-in document management system. This means that asset information to always follow equipment movement in a robust way.

All documents call one place "home." This approach reduces document search times and helps expedite equipment maintenance and eliminating any problems resulting from improper maintenance.

A fourth key point continues the user-friendly aspect. Ease of use results in considerably better data accuracy while lowering the cost of training and support calls, all of which generally reduces operational costs.

Yet, over and above cost savings, the real benefit comes when users begin receiving data from the field. They can start making decisions and making changes as never before possible, with no interruptions to operations. Thus, ease of use also means ease

of adoption, which results in time savings when getting started because training often is completed in less than a few hours for new users at any level.

Evolving RigMS to meet the needs of the future is a priority for NOV teams working with drilling organizations and individual contractors to increase value associated with improved equipment availability.

Looking ahead, a major focus is on making the transition from preventive maintenance to predictive maintenance, with data acquisition personnel now collecting information on which this transition will be based.

3rd party auditing

In the wake of tightening of drilling regulations, which require 3rd party auditing of maintenance and drilling procedures, RigMS can be a real value-add.

RigMS is primed to assist offshore operators with its unique capabilities by tying data collection into support decision models to (1) provide recommendations on critical ongoing maintenance for the rig and (2) provide warnings based on pre-set operational triggers. The result is a higher level of equipment availability which benefits contractors and operators alike.



Digital oilfield: what is really involved?

Implementing digital oilfield means a lot more than technical implementation of apps, writes Dutch Holland of Holland Management Coaching

The digital oilfield movement is here and it offers great potential.

But how does one realize that potential for his company? Simple. All that is necessary is getting executive management to speak the Magic Words ... as in the interview below, at the annual stockholders meeting of a public company)

Wall Street Analyst / audience member: I've been reading about the Digital Oilfield and it sounds important. What are you guys doing?

CEO: Good question. We fully realize the value of digital technology as a key performance improvement tool. We've successfully completed two DOF projects thus far and I've given the "full speed ahead" signal to fully realize the business value of DOF. In fact, gains from DOF deployment are now specifically identified in our corporate strategy and goals.

Chief operating officer (in charge of Production): I agree with the CEO. We in Production have examined every inch of our

production and business workflows and we've identified those steps where applications of digital technology can produce the most business results. We have specific goals in place to realize that business value and our guys are hard at work with our IT folks to take advantage of those opportunities.

CIO: My organization thoroughly understands those places in the business where digital technology can add value. We've worked both inside our shop and outside with our vendor community to nail down the technologies and tools that we'll need to bring to the business workplace to meet those specific business goals. Let me read a letter I just received from our DOF vendor. "Thank you for selecting our company to be your lead DOF technology provider. Your specific explanation of your needs and goals will allow us to meet our needs now and in the future."

Simple, right?

Those are indeed the Magic words for DOF maximization. But what's behind those

words from the CEO and his Team?

Enterprise Architecture

Architecture may be a fancy word but it is being used today to describe how an organization or an enterprise is put together.

Enterprise architecture (EA) is a comprehensive description of an organization's elements, i.e., its moving parts, including enterprise goals, business functions, business processes, organization, roles, business information systems, software applica-



- Dr Dutch Holland,
Holland Management
Coaching

tions and computer systems.

When an upstream organization decides to go for it to maximize the use of digital technology for business value, the organization's architecture must be altered and configured specifically for digital technology. The resultant of reconfiguration can be called DOF Enterprise Architecture (DOF EA).

As an example: when an upstream company decides to make DOF adoption a higher priority, the goal statements of Senior Managers might be configured to include specific business gains through the use of digital technology.

Or, for another example, the business organization may be called on to identify the specific parts of their workflow where digital solutions (e.g., collaborative technology, data bases that can talk to each other) might make a positive gain in business results.

DOF EA can be described as a combination of three different structures that must be aligned and integrated to maximize the business potential of digital technology.

Strategic Business Architecture ... including the company's DOF vision and strategic goals, measures and incentives

Work Process Architecture ... including the matrix of technical and business work processes needed to achieve DOF strategic goals

Technical Process Architecture ... including the processes inside the IT or R&D organization to manage the digital resources required to enable work processes and enterprise optimization



Strategic Business Architecture

Everyone knows that something goes on at the top of their company ... sometimes it seems mysterious.

Actually, there are a handful of organizational elements that senior managers work with which will need to be re-configured to get DOF into full play as in the list below.

Strategic Business Processes

Company vision, goals and strategy explicitly reflect the company's intention of adopting Digital Technology for improved business results

Executive commitment to DOF is

shown by investment in DOF architecture and by willingness to use pro forma results

Incentives are in place to motivate DOF exploitation

Robust portfolio management is in place for all capital investment decisions including DOF

Explicit decisions to "Deploy" or "Give Permission to Adopt" are made for each DOF initiative

Work Process Architecture

Work Processes (sometimes called "workflows") are the steps organization members take to do the work of the company. Included are the technical steps associated with production engineering as well as what may be called the business steps of "making economic decisions about production."

It is the day-in/day-out completion of these many steps that move an organization toward its business goals.

And it is these workflows that must be altered and enabled by digital technology that turn out to be the heart of the DOF movement. Improving process results is the name of the game ... but first, an understandable work process architecture is needed.

Work Processes

- Comprehensive map of core processes is in place ... i.e., "value-added," "management," and "enabling" work processes

- Integrated goals with metrics are used across work processes

- Aligned structure, roles, KPIs and incentives are in place and in use around integrated goals and work processes

- Proven method for targeting and developing business improvement opportunities (BIOs) and requirements is in place

- Robust Business Readiness implementation method (for processes, technology and people) including comprehensive risk management is in place

Technical Process Architecture

Not only are there business workflows but there are very specific technical workflows required for the organization-wide adoption of digital technology.

While some of the workflows in the list below may look familiar, there are some flows that might be seen as "new" for the technology end of the business. New for some but still absolute requirements for a company that is going for it.

Business Needs Discernment that accurately comprehends the range of operational transactions and decisions that could be made by the business

Technology Architecture Design that optimizes the company's technical capabilities

ty to support all types of work processes needed by the business to meet its goals

Technology Acquisition that both drives vendor innovation and secures needed technologies to support architecture design

Systems Readiness process in place that can produce apps and systems that meet Business Improvement Opportunity requirements

Proven and secure implementation Process is in place that does not put operations at risk during technology implementation and test

All or Nothing

The reader might ask, "Does all this stuff have to get done to get DOF into play?" The short answer is "yes."

The initial concept of DOF EA has been broken into three more manageable categories ... but the categories are interrelated. Fail to complete one category of organizational reconfiguration and the end result will be greatly disappointing from both an operational and economic point of view.

If you have a work process architecture, a technical process architecture but no strategic business architecture, the end result is slow and spotty business results.

If you have a strategic business architecture, a technical process architecture but no work process architecture, the end result is technical success but business failure.

If you have a strategic business architecture and work process architecture, but no technical process architecture, the end result is good DOF intentions but no results.

Future Vision for DOF

Companies will gain the most from the employment of digital technology if they can have their senior managers honestly speak the Magic Words as above.

However, before those magic words are spoken, there are important steps to take to get a company's Enterprise Architecture ready for DOF. DOF EA: Don't leave home without it.

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Managing your alarms

We've all heard stories about offshore drilling rigs and production platforms where people had so many alarms going off they kept them all disabled. What can be done about it? We spoke to Don Shafer, chief technology and chief safety officer at Houston consultancy Athens Group

One of the most troubling stories which came up in press reports from the Deepwater Horizon disaster was that crew onboard the rig may have had alarms switched off.

But it is not surprising that crew have a strong temptation to switch alarms off, when you read how many pointless alarms they might have to listen to during a typical day.

"We found that up to 5 alarms, 10 alarms a minute is not abnormal," Mr Shafer says. "It's an insane number of alarms to handle, day in day out. People cancel the alarms without bothering to find out what they are."

In one typical example, a driller had an alarm right behind their head which would sound if a watertight door had been opened. But people can see for themselves that a watertight door has been opened. "The driller doesn't need an alarm behind their head," he says.

The problem of too many alarms is not getting any better. At a recent industry conference, Mr Shafer was told by a delegate that the biggest advance the industry has made in recent years is having a button which says 'clear all alarms'.

When people are designing alarm systems for specific pieces of equipment, you can understand why the tendency is to program "if in doubt, sound the alarm". But the end result is that crew end up hearing many alarms they don't need to hear – or get confused about what they mean.

Ideally you would like the rig to have a central computer which would process the alarm data, and work out if it was something the crew really should know about right now, and if so, whether a sounding alarm or an information message on a console would be more appropriate.

And if many things go wrong at once, as they would in a major disaster, this central computer only sounds the most important or most useful alarms, restricting it to (for example) under 10 alarms in 10 minutes, as recommended by the EEMUA (Engineering Equipment & Material Users Association) standards and guidance.

But it would be very difficult to build such a computer. There are no standard protocols for electronics to communicate alarms data, and also the software company building the computer would be very reluctant to accept liability if there was an accident due to a decision their computer made.

The most useful thing rig operators can do, Mr Shafer says, is do a comprehensive audit of their alarms, so they know exactly which alarm will trigger under which conditions.

With this understanding, they can work out alarms which are likely to be mainly useless and make a judgement about whether to reprogram them.

Also, next time they upgrade any of the software, they can more easily check which alarms it could potentially interfere with.

Athens Group has been operating since 1998, providing risk mitigation services for the offshore drilling industry.

It has been involved in 36 different projects where it does alarm mapping, working out which exact conditions will trigger an alarm.

The company is working on newbuild projects in yards in South Korea and Singapore, and is working on projects for many of the leading drilling and oil companies, including in the North Sea, Brazil, Africa and the Gulf of Mexico.

One current project is a newbuild fleet of drillships, where Athens Group has worked since the start, putting together a plan as how the alarms will work, and mapping the alarms which got installed.

"When the drill floor gets put together, and the power management, the dynamic positioning – we have all the alarms mapped at that point," he says.

Clients have included BP, Chevron, Exxon Mobil, Maersk, Noble Drilling, Pride, Shell, Stena Drilling, and Transocean.

The company staff have expertise from military and aerospace, which often has a much better track record with alarms management than the oil and gas industry does.

The audit process

Auditing the alarms on a rig is a very labour intensive process. "It is days and days of work," Mr Shafer says. "For a rig we've never looked at before – it is a person month of effort. A lot of the older rigs we're out there with volt ohmmeters trying to determine where the wiring goes."

Nearly all equipment has some kind of software involved in it – and understanding how that software actually works, if you are not the manufacturer of it, is very hard.

"It takes a concerted effort to go out and ensure the software is working correctly," he said.

"We're ensuring that we get correct alarm maps and we put those alarm maps in place, and at the same time ensure that there's a configuration management process," he says.

Once an alarm map has been put together, the rig operator can decide if it can be improved upon, and then make the alarm map standard across the fleet or the company.

The problem is further complicated by software upgrades, which can upset all the auditing and alarm calibrations.

"The longest time we've found between when the rig was operating before the first upgrade of software was 60 days," he said. "Then I've got to go back and retest everything to make sure I haven't violated my theory of operations for my alarms. Where something does change, we can tell what alarms are impacted."

"We're working with a couple of the majors to work out how do we put some of these things into software contractual standards, so that when they get equipment build they have to put alarm management into the overall equipment specification. The operators – the majors – have all the leverage here."

Standardisation

The oil and gas industry would really benefit from more standardisation across the industry, on which specific scenarios or conditions should cause an alarm to sound.

"One of the most critical things we need in the industry is to put that committee together," he says. "I would volunteer to spend every day working with API on a committee like this."

"The oil majors and drilling contractors should be putting these standards together," Mr Shafer says.

Creating standards takes a long time – up to a decade – and so far no-one has made a start in oil and gas, he says.



- Don Shafer, chief technology and chief safety officer, Athens Group

Drilling data on your cellphone

smartreasons LLC, a company based in Houston, Texas, has developed technologies which can enable various levels of an organization to track relevant real time information and crucial KPI data, including on their cellphones

Staff on the rigs and in the office can monitor onshore and offshore drilling activities as they happen, using their smartphone or handheld. There are plans to include other real time data protocols in the near future.

The company was set up by Matt Tatro, a past country manager in Continental Europe with Landmark, on the understanding that while the exploration and production industry has made great strides over the past years in deploying ever more complex sensors to capture real time data, the efficient use of this information is still lagging far behind.

Mr Tatro also believes that the new global economy will be led by companies that can transform data to decisions faster than the competition.

The technology allows users to collect, customize and visualize real time data, and provides them with decision support systems. Users can form "Decision-Communities" and collaborate around key data and key performance indicators.

"We see that the next game changers are speed (data in real time), scale (process-

ing power), and sensors (new kinds of data)," Mr Tatro says. "Our technology gives end users access to this data and leverages networked knowledge workers to transform this data into smart decisions."

"We believe that the data should come to you and in capital intensive operations (such as deep water drilling) where safety and cost are a concern, data should reach decision makers regardless of if they are sitting in real time center or not."

Central server

The application includes a central server software, which can run in the company office or on an independent cloud service, and software applications on people's handhelds (currently it works on Blackberry and Android phones).

The central server can receive a data feed in WITS or WITSML format, with additional data protocols to follow suit. It is also planned to integrate with E&P industry leading drilling software packages and databases, such as Landmark's Engineering Data Model (EDM) and OpenWorks.

This way planned drilling and geological data could be distributed in real time together with the actual drilling information. The tool can potentially integrate with any software, and the company plans to build integrations as clients demand them.

Accessing Real Time Drilling Data

From their handheld devices, individual users can monitor several attributes about the drilling process, such as wellbore trajectory, torque, drag or hydraulics.

Users' phones can monitor up to 5 different data streams resulting from 5 concurrent rig operations simultaneously – with new data being sent every time the value updates.

Users can set customized alarms for whatever parameters they would want to be warned about. For example, a drilling manager would want to receive a message (alarm) on any unscheduled drilling event. This could be triggered by comparing measured real time values such as weight on bit or surface torque to planned or engineering values.

The software can continue running in the background even when the person is not



Monitor several attributes about the drilling process, such as wellbore trajectory, torque, drag or hydraulics on your smartphone, using smartreasons software from Matt Tatro

looking at it. In areas, where use of mobile devices is prohibited (such as offshore rigs), users can resort to utilizing a web interface at their internet browser, giving them the same connectivity and view with added feature and function.

"We would imagine that eventually all personnel inside and outside an organization that need to know about a particular drilling activity get access to crucial data, including contractors, government and emergency response agencies," Mr Tatro says.

Users can send each other voice messages, video, images and text, with the recipient notified by a buzz on their phone, a message in their inbox or a blinking light.

If the server is connected to other software packages they can view this data on their cellphones as well. The software also records the location of everybody monitoring the data, if they have a device with a GPS in it, which can be a useful safety tool, particularly when it is important to quickly find the right person.

In the future, the company plans to send out 3D graphics updates, which will work on cellphones which have high performance graphics cards on them. "That is really only limited by bandwidth," Mr Tatro says.

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Viewing real time drilling data on your Blackberry

Knowledge Reservoir alliance with Cimarron

Knowledge Reservoir, a geosciences consulting house based in Houston, has announced a 'technical alliance' with Cimarron Software Services, which manages real time data systems for NASA

The tie-up follows a large oil major in Houston (thought to be Shell) looking for better ways to manage real time data and control systems, and having a chat with nearby NASA (North American Space Agency) to see how they do it. Cimarron installs real time command and control systems for NASA.

Shell gave a joint presentation with Cimarron at a recent conference in Austin.

Cimarron has developed a process which can send reliable real time data from any sensor, using a range of different data communications networks, including satellite.

Coming specifically into the oil and gas industry, people would like to get a lot more data than the standard LWD / MWD data streams. "People want all the relevant data they can get, and different disciplines will certainly want very different data," says Larry Denver, president of Knowledge Reservoir. "Marine thruster data, mud data, weight on bit, production and pressure data, what is coming out of the hole, etc".

"If you really monitor fluid flow carefully you'll know what's going on and generate fewer surprises," he says.

"Our goal is to get real time data that drives reservoir decisions," he says. "There's a lot we can do with it to better manage reservoirs, or just reduce drilling costs."

The current industry fashion of measuring data only after certain time periods is equivalent to a car driver who only looks

where he is going every time he reaches a stop light, he says. "But the data is there all the time. We say the data is out there, and there are tools to analyse it."

Knowledge Reservoir and Cimarron are already doing their first deal to work together, he says.

The two companies will provide systems and services for real time command and control, and events based surveillance, for the oil and gas industry.

Cimarron engineers had a major part in the design and implementation of NASA's Mission Control facilities for the Space Shuttle and the International Space Station. Cimarron has worked with NASA since 1988, in development, maintenance and operations of the facilities.

The company has also focused on using commercial off the shelf technologies, with open systems, moving away from proprietary systems and custom programming. This makes it easy to replicate systems (ie once you've built it once, you can build it many times).

Areas where the oil and gas industry could benefit from Cimarron's experience with NASA, says Knowledge Reservoir CEO Ivor R Ellul, include automating the tasks of collecting and quality controlling data and unravelling complexity.

Also using the same data in project management, maintenance and production man-

agement, tracking alerts and actions.

"The oil and gas industry has reached the point where technology requirements have reached a critical level and cannot be propagated and supported successfully or cost-effectively by proprietary internal systems," says Marv LeBlanc, vice president at Cimarron.

"Commercial off the shelf technology and systems with no custom programming or coding required, greatly reduces cost, improve efficiency and sustainability."

"Cimarron's solution is not about special hardware or equipment, but system integration engineering and real-time telemetry implementation, defined as the ability to agnostically architect an efficient system in virtual and command center environments, at greatly reduced cost."



"If you really monitor fluid flow carefully you'll know what's going on and generate fewer surprises" - Larry Denver - Larry Denver, president of Knowledge Reservoir

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Developments with Reality Mobile

Reality Mobile of Virginia, USA, has a number of projects in place with major energy companies around the globe, helping them stream dynamic data and video feeds using smart phones, laptops and other devices

Recently, a large integrated oil company in Eastern Europe deployed its RealityVision tool to enable richer communication among its teams in an effort to increase drilling productivity.

Another company plans to test the use of RealityVision to improve employee collaboration related to production activities in Iraq.

An onshore operator was able to reduce the number of staff needed to address an electric submersible pump (ESP) failure at a remote work site by deploying RealityVision. By connecting its ESP technical experts to on site employees through a secure smart phone video feed, RealityVision allowed off-site experts to

analyze the tear down process remotely before dispatching personnel. As a result, the company sent only three employees to the site – four less than typically required – and saved on travel costs while significantly reducing downtime by speeding the diagnosis and remediation process.

RealityVision is gaining traction in the upstream sector because it allows organizations to visually link subject matter experts with remote assets and field teams in real-time, the company says. Its capabilities bring new remote monitoring possibilities to the fore, such as capturing readings from gauges on older equipment that do not have digital outputs. At the push of

a button, real-time images of these gauges can now be captured and distributed as a live video feed to any number of users around the world.

Mike Odell, Reality Mobile's director of global energy markets, notes that a majority of E&P companies have made substantial investments in fixed camera networks and communications equipment. The highly mobile RealityVision platform allows customers to fully leverage their existing infrastructure to help users make faster, more informed decisions—particularly when time is of the essence. "Every major oil company has some type project underway that can benefit from the ability to evaluate situations in real-time," says Mr. Odell.

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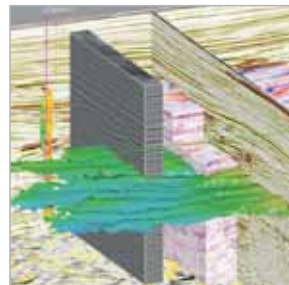
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