Digital Oilfield: cutting edge = cutting costs

The challenging offshore and oil and gas exploration environment requires a certain type of communications that can fulfil a variety of different requirements. It is vital that the service provider understands what is required by the end-user, and that the end-user understands how satellite networks are being used to support all aspects of the offshore environment. Helen Jameson takes a look at this demanding sector of satellite communications.

Oil and gas are the most important commodities in the world. They are vital to the human race's ultimate survival. It is used for everything – for power, for manufacturing, aviation, running our cars, heating our homes. Oil and gas fuel the world, but perhaps the most significant point about oil and gas is the fact that both are running out. This is driving oil exploration teams further and further afield in an attempt to discover new sources of fossil fuel. Teams are being forced to work in remote areas that are devoid of terrestrial communications. At the same time, oil and gas companies are looking to minimise their costs, especially in the current economic climate, despite the high price of oil. They also need to reduce risk, improve their performance and maximise their exploration. They need a cost effective way that will allow them to communicate constantly with their remote teams and to monitor their existing pipelines 24 hours a day, seven days a week, 365 days a year.

The oil companies rely on reliable voice, video and data connectivity to keep in close contact with their teams, their rigs, their pipelines and offices all over the world. This is a huge operation and their objectives can only be met with the use of satellite communications that can operate in often harsh and unpredictable environments – from desert drilling where the heat is stifling to offshore oil platforms where wind, rain and waves make for an incredibly hostile workplace.

When it comes down to communications, the oil and gas industry looks to satellite as the most reliable and efficient means of communication. Deployable with no prior infrastructure, in the most hostile of locations, satellite can deliver all the required communications. The size of today's terminals means that they are highly portable and mobile and ideal in rapid response situations. Shared bandwidth equals cost reduction. Advanced modem modulation increases bandwidth, redundancy and backup, enabling critical real-time operations. Satellite is the complete package.

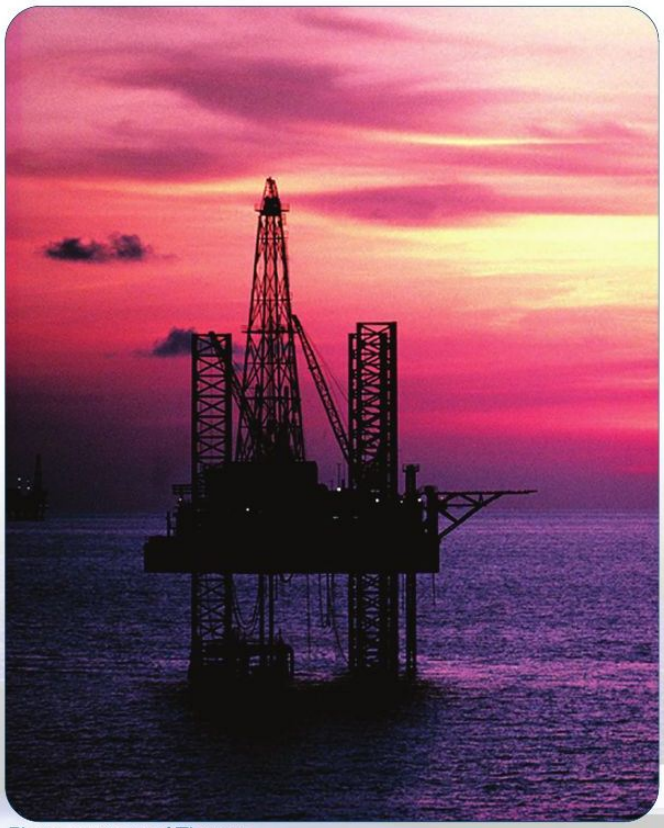

Photo courtesy of Thuraya.

The Digital Oilfield and the end user requirements

The so-called 'Digital Oilfield' brings a high level of collaboration to the industry, connecting all sites with the company headquarters. It is hoped that the Digital Oilfield will bring about high productivity, reduced costs, increased reliability, safety and high employee morale.

It may help to first establish the requirements of the oil and gas companies. What are they looking for in a satellite network?

Firstly, Quality of Service (QoS). To an oil company, communications are literally mission-critical and for them to be interrupted or unreliable or insecure is simply not an option. The rigs and oil exploration teams must be accessible at all times via a secure path. Data must be transmitted on a continual, always-on basis and for that reason, QoS is the priority for those companies involved in the sector.

The end-user is also looking for 24 hours a day, 7 days a week support from their service provider. They expect complete dedication. As mentioned, no failure in the network can be tolerated and any technical glitches must be dealt with as quickly as possible. Therefore, an experienced and knowledgeable team who know their product to its very bones, is essential.

Remote and on-site management of the network will enable the end user to monitor the sites on a continuous basis. They can operate the network as per requirements through a simple interface on a laptop, regardless of whether they are on-site or not.

We have already mentioned bandwidth management. Bandwidth is expensive and in short supply, especially in many regions of the world where oil and gas teams are based. Therefore, it is imperative that the user is able to get the most out of their bandwidth. The new applications that have emerged in recent years and that are extremely helpful to the industry such as video, live data exchange and crew welfare services, are bandwidth hungry and careful use of what is available is important. There are products on the market that help alleviate the bandwidth problem.

Oil and gas workers operate in extremely harsh environments from very hot and dry conditions to extremely cold and wet regions of the world. Therefore, the equipment used must be able to withstand these harsh and hostile conditions. It must be specially ruggedised, adapted and tested by a manufacturer before it can be used in the field

IP is now widely used in all types of satellite network but it is also important that legacy protocols are remembered when offering communications to the oil and gas sector. Not all networks will have migrated across to IP so the legacy equipment must be supported.

In the era of the mobile telephone, it must also be recognised that GSM and wireless technologies are often the communication medium of choice in remote environments. The network that is selected should support cellular and wireless communications.

Mobility now more than ever, is a key part of any oil and gas company's communications network. The need for exploration teams to go further afield has become more vital. Trucks and vessels, even airborne communications are used for exploratory reasons. They must all be equipped with mobile communications systems. Flyaway satellite systems are used extensively to support the industry due to their portable nature and ease of deployment.

Back-up solutions for terrestrial networks are also a vital consideration for the wide-ranging oil and gas industry that is not simply about exploration and drilling teams but is also about retail. Remote retail outlets and also offices will require a high level of redundancy in case of any interruptions to their terrestrial communications. Satellite, especially VSAT plays a very important role in supporting terrestrial communications that may have gone down to due to an event such as an earthquake. VSATs may be deployed at any location to take over communications if an unexpected outage were to occur.

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Finally, there is the burning issue of cost. In times such as these, where every penny counts, satellite service providers must concentrate on offering the best solution at the best price. The network must be cost effective yet scalable, versatile and of high performance.

Crew welfare

The importance of communications cannot be underestimated from the point of view of the crew employed in remote locations, whether that is for exploration or drilling purposes. Communications provide their link to the outside world. The environment is a very isolated one and keeping in touch with family and friends on a daily basis will help retain a high level of crew morale. The connectivity also allows them to use the Internet and to access television for recreational purposes.

Security via VSAT

A principal concern for oil companies is that of security – of the information passed around a network and of the employees. A shared infrastructure is all very well but it does raise security issues. Ideally, the company employees will be able to share information and to communicate with no worry of infiltration. VSAT networks have proved themselves to be highly secure and are now widely used in the oil and gas sector. But it's not just security that VSAT does well. The antenna equipment used is highly resilient and offers key advantages for utility monitoring systems in remote areas.

VSAT is the foundation of a reliable networking solution that not only increases reliability but also introduces new functionality and capabilities all the time. VSAT is more than capable of meeting the oil and gas sector's needs.

A network, whether that is via satellite, terrestrial, wireless or a blend of all three can help oil and gas companies to a huge extent. If it is well managed it can result in the reduction of production, drilling and exploration, refining costs and also transportation of the product to its chain of retail sites and the sale of the end product to its customers. The advent of broadband technology has changed the face of oil and gas communications along with the VSAT. This is a trend that is set to continue.

The cutting edge Digital Oilfield streamlines the entire oil and gas chain resulting in more efficient production and delivery with less OPEX and CAPEX required. It can reduce the amount of personnel needed to operate on certain sites, delivering critical information in real-time, no matter where the site is located. Satellite and broadband technology has found a niche in the oil and gas industry. Without it, the business of finding our fuel for the future would be an even more challenging task than it already is.

Photo courtesy of BP.