ENHANCING CRITICAL CONNECTIVITY

SANJAY SINGAM, ITC GLOBAL, EXPLORES THE SIGNIFICANCE OF OPTIMISING MISSION CRITICAL DATA TRANSFERS AND ENABLING DIGITISATION IN REMOTE OFFSHORE ENVIRONMENTS.

Automation in the offshore oil and gas industry is improving operational efficiencies. This push towards achieving optimal productivity levels is also significantly increasing data requirements, which can sometimes be challenging to accommodate in the harsh and remote environments where rigs and vessels typically operate.

Exploration and production operators, drilling contractors and service companies alike are beginning to remotely monitor assets and operations in real time, as well as mine billions of data points to find new productivity and performance insights. Mature assets are getting data tags for efficient oversight and maintenance schedules to keep production profitable, while new assets are being built from the ground up with the latest in internet of things (IoT) and application

technologies to support the increasing volume and complexity of drilling operations. According to a McKinsey & Company report on digitising oil and gas production, a typical offshore platform can have more than 40 000 data tags, not all of which are connected or used. Depending on the type of communications on board, a rig can demand more than 10 megabytes (MB) of capacity on a daily basis to support data downloads and uploads, requiring a reliable, high-availability connection – especially considering critical data is transferred back to an onshore control centre or corporate office.

Reliable communications are critical not only for productivity, but also for the safety and welfare of crew members and remote staff working in offshore environments. Partnering with an experienced communications provider with reliable coverage across the globe can help companies mitigate connectivity challenges as data requirements continue to rise. This will become especially important as offshore operators look for ways to optimise the applications on their networks and deploy solutions that can grow in parallel with the deployment of increased IoT services in an ever-evolving, 'always-on' world.

Figure 1. *By leveraging reliable, always-on communications solutions, operators can implement a wide range of technology and applications to save time and money.*

Figure 2. *An ITC Global automation specialist programming a new PLC and HMI while deployed offshore.*

In this data-driven environment, critical connectivity links are helping to enable new opportunities to advance operational performance and effectiveness in real time, as well as to proactively monitor and mitigate risks. Applications and technologies such as sensor data, remote video streaming, crew welfare solutions, and more, can now be fully harnessed via robust, optimised network connectivity.

SENSOR DATA

Sensors are growing in popularity as connectivity becomes more reliable and regulations for equipment stability increase. Pipeline monitoring is one of the most important factors facing oil and gas operators and requires absolute accuracy. Sensors can be placed at intervals along a pipeline, near valves or on equipment to monitor flow, pressure, temperature, vibration and more. These sensors record and send data from the equipment, which is then combined and supplemented with other operational input to make sure everything is running smoothly. If a spike or abnormal measure is recorded, these sensors allow operators to locate the specific part of the pipeline or equipment that is malfunctioning and fix or replace the faulty piece before failure occurs. Preventative monitoring and maintenance like this can save operators time and money by not waiting to react to a part that has already failed.

DATA TRANSFER TO ONSHORE CONTROL CENTERS

As automation increases in the offshore oil and gas industry, much of the data collected by rigs and vessels is transferred back to onshore control centers or headquarters around the globe for processing and review. Without a strong communications solution in place, operators may struggle or even fail to deliver this data. Optimising the network pipe is a key driver in enabling the management and analysis of massive amounts of data coming from the offshore environment.

Many routine checks and processes conducted offshore are also being reviewed by operators for opportunities to inject automation. As an example, computers now often direct drills that have typically been managed manually in the past. The same is true for sensors on wells that can monitor for leaks or pressure changes instead of leveraging an on-site technician to conduct checks. Robust network connectivity allows onshore engineers to supervise activities in real time without having to deploy to the remote asset.

Without the ability to guarantee real time communications and transfer data reliably and consistently, operators sacrifice both efficiency and productivity. Additionally, incomplete data sets make it harder for operators to catch abnormalities in the data. This opens the company up to all kinds of consequences, including a decrease in the amount of product coming through the pipes, machinery and equipment failures, and leaks.

REMOTE VIDEO STREAMING AND REMOTE OPERATED VEHICLES

While not new, the growth of reliable communications and bandwidth capabilities has promoted remote video streaming

(RVS) technologies to serve a broader set of oil and gas operational needs. RVS enables real time monitoring and inspection of offshore assets and remote facilities. Video data collected is transferred back to a remote site or onshore control centre, allowing technical teams to remotely assess and identify issues. Being able to monitor subsea operations or visually diagnose a problem in order to immediately implement a solution is critical for customers. RVS technology can enable quicker decision making and reduce the frequency and cost of dispatching personnel for maintenance work at remote sites. The technology can also address regulatory oversight and enforcement that may be required, especially when related to monitoring and health, safety and the environment (HSE) initiatives in offshore environments. ITC Global recently deployed RVS services to a long-standing customer in the Gulf of Mexico, enabling wellhead monitoring for their offshore operations. To complete their project, the customer required real time video streaming of the subsea activity that could be accessed via a secure internet link.

Remotely operated and autonomous underwater vehicles (ROVs and AUVs) are also important tools for operators in the oil and gas industry. Similar to RVS technology, these vessels enable subsea monitoring of underwater equipment and pipelines along the ocean floor through the use of remote video streaming and data transfer. By sending data or video streams back to the rig or main control center, these vessels can be directed and controlled remotely.

This data is combined into the Human Machine Interface (HMI) platform that enables real time decision making, such as scheduling maintenance or alerting the crew of a leak. Additionally, the operator is able to view the subsea environment without actually having to be underwater. As drilling depths increase to levels unsafe for humans, ROVs and AUVs will play an increasingly important role in the industry.

CREW WELFARE

The welfare of the crew on board a vessel or rig is becoming a vital part of a company's continued operations offshore. With the increase in the use of digital devices, such as smartphones and tablets, crew members now expect to have the same level of connectivity offshore as they do at home. However, the remote environments that many rigs and vessels occupy make providing this kind of connectivity difficult without partnering with a dedicated and experienced service provider.

Company owners and operators should invest in a solution that provides this connectivity without compromising their corporate connectivity needs, or their bottom line. An optimal connectivity solution would allocate bandwidth for crew and business operations separately. This separation enables operators to provide connectivity for their crew during down time and off hours without worrying about saving bandwidth to cover day-to-day operations.

A solution that includes a pay-as-you-go internet service, enabling users to keep in contact with family and personal business back home, or stay up to date on current events and entertainment, can significantly increase crew contentment and retention without breaking the bank or affecting productivity and efficiency.

ITC Global's crew connectivity and entertainment platform, Crew LIVE, recently transmitted more than 1.8 terabytes (TB) of data on the network over a one-month period, with an average of more than 300 gigabytes (GB) monthly data per user. This level of demand and activity makes the value of a reliable network critical in delivering high-availability service to users.

ACHIEVING ALWAYS-ON CONNECTIVITY TO SUPPORT HSE

As additional emphasis continues to be placed on the importance of a remote site's HSE capabilities, operators have shown a desire for complete control and flexibility over the communications of their remote sites. To enable rig operations to maintain 99.99% availability and ensure connectivity levels are up to par with an organisation's HSE needs, operators can leverage unique dual-stack network designs, which deliver 60 to 80 megabits per second (Mbps) of bandwidth for enhanced reliability, throughput and resilience.

This type of solution includes dual stacks of equipment and dual antennas on board each offshore asset, with the antennas looking at different satellites, on different RF bands that land traffic at different teleports, offering increased satellite diversity for complete resilience and redundancy. The high-availability design ensures that failure of any teleport, terrestrial link or satellite will not result in loss of network service. The teleport and satellite fail over – from loss of signal until reacquisition – can occur in a matter of seconds. In the event of a failure of the satellite or teleport, remote modems will automatically switch to the alternate carrier from the backup teleport. During the network design, primary and alternate satellites are selected to maximise line-of-site diversity to mitigate blockage. The single technology platform can also accommodate different remote sites globally.

With the advent of high throughput satellite (HTS) technologies, the solution can effectively accommodate a remote site's growth in bandwidth, since HTS satellites can deliver much higher bandwidth per site using the same antennas and equipment.

MISSION-CRITICAL COMMUNICATIONS

By leveraging reliable, always-on communications solutions, operators can implement a wide range of technology and applications to save time and money in the long run. Communications for both business and crew purposes increase retention, safety and security, boost productivity and efficiency, and allow operators in remote regions to rest assured that their business is running smoothly.