ENHANCING OIL AND GAS OPERATIONS WITH SATELLITE BROADBAND CONNECTIVITY

The isolated nature of many oil and gas facilities has long made connectivity challenging, but satellite broadband offers a dependable way to bridge the gap.

The global oil and gas sector is facing a huge and constantly growing demand for reliable connectivity and bandwidth. More than ever, mission-critical communications, crew welfare, and innovation itself depend on these vital factors. However, as global oil and gas prices continue to fluctuate unpredictably, broadband services need to be delivered at much lower cost to be justifiable.

Satellite broadband has long played a key role in the digitization of oil and gas, with the sector being one of the heaviest users of the technology. After all, given the remote nature of facilities like oil rigs, pipelines, and ocean-going tankers, satellite connectivity remains the only option available.

Satellites have now become the eyes and ears and nervous systems of oil and gas operations around the world. That said, satellite broadband goes far beyond simply offering connectivity to some of the most remote sites in the world. Modern solutions enable significant operational improvements by allowing the connection of data from digital equipment like SCADA control systems, IoT sensors, and surveillance drones.

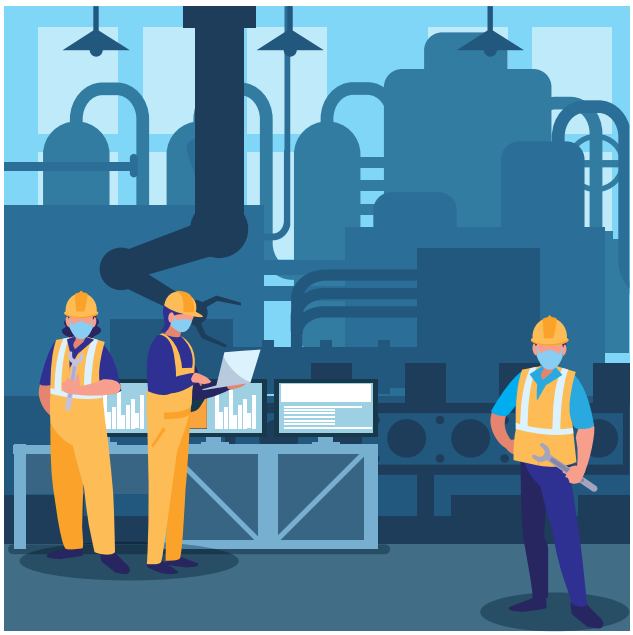
The importance of pipeline monitoring in the oil and gas industry

Pipeline monitoring is nothing new to the oil and gas sector, but conventional SCADA control systems cannot provide the granular visibility into critical assets needed to proactively prevent disasters. Problems such as corrosion, debonding, and cracks can lead to disastrous leakages with far-reaching and often irreversible environmental consequences. Even though pipelines offer the safest and most reliable way to transport oil and gas overland, hazardous incidents cost the sector an average of $326 million every year. Almost half of this figure is attributed to environmental and remediation costs.

The safety and sustainability of oil and gas operations depend on the universal availability of broadband internet connectivity. When it comes to monitoring and maintaining hundreds of even thousands of kilometers of pipelines and other facilities, it is vital to know exactly what is happening at every meter. Unfortunately, conventional terrestrial networks, such as fiber optic, cellular connectivity, and DSL broadband simply cannot provide the coverage to allow for exhaustive monitoring. Therein comes satellite connectivity, which can be made available everywhere with a line of sight to the sky, and it is now more affordable than ever.

One of the main reasons for the increasing demand for bandwidth in oil and gas is the rise of the Internet of Things. For example, IoT sensors may be installed along segments of pipeline to monitor crucial external metrics like temperature and humidity and internal metrics like flow rate and pressure. They can also monitor the infra-structure itself to detect potential leaks. The data is uploaded to the cloud in real time, typically through a low-power wide-area network, or LPWAN, with satellite connectivity. This lets operations teams maintain complete oversight into assets and proactively address potential issues before they can lead to costly disasters.

Modern IoT technology is vastly more sophisticated and responsive than traditional SCADA control systems. For example, internet-connected sensors can report reduced pressure, which may indicate a leak. Ultrasonic sensors can detect cracks before they actually lead to leakage. Magnetic sensors can detect changes in pipeline wall thickness to indicate corrosion. The list goes on. Finally, smart sensors also communicate the location and severity of the problem, and they do so almost instantaneously due to the universal availability of satellite broadband, even if these are located at the most remote regions around the world. This allows oil and gas operators to reduce the risk of human error, proactively troubleshoot problems, automate manual tasks, and optimize asset utilization at practically any scale.



Enhancing oil and gas operations with satellite broadband connectivity

While reducing risk with comprehensive monitoring and proactive maintenance is the primary focus of the digitization of oil and gas, the benefits of improved connectivity do not stop there. The benefits of universal broadband connectivity extend even further to include reduced costs, improved productivity, and enhanced throughput.

According to the latest findings by McKinsey & Company, improved connectivity can unlock up to $250 billion of value for the sector. Given the importance of the oil and gas sector in the Asia Pacific region, this presents an enormous opportunity to become more competitive on the global stage. Also, the unpredictable nature of oil and gas prices has placed the sector under increasing pressure to optimize operational costs.

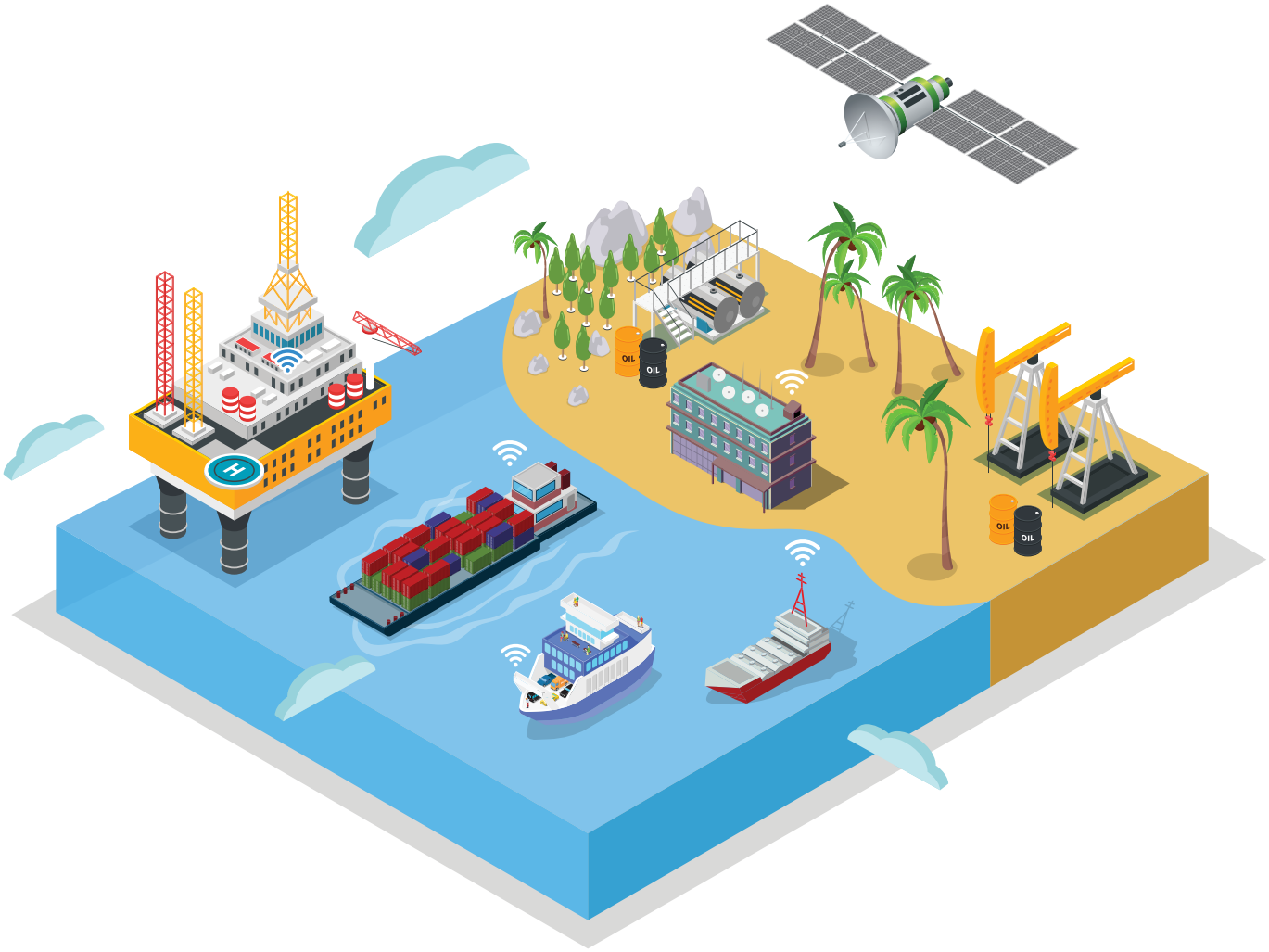
Satellite broadband has come a long way in recent years to reduce costs and address growing bandwidth requirements. These benefits can be enjoyed throughout oil and gas operations from prospecting to ongoing monitoring, maintenance, and asset optimization.

The case for using satellite connectivity to boost employee morale must not be underestimated either. Life on an oil rig, for example, is necessarily isolated and often stressful. These factors have a knock-on effect on productivity and mental health alike, especially for those required to operate for extended periods in remote areas. Satellite broadband is now affordable, and it is fast enough to serve more than critical operations alone. With the simple and efficient setup of a VSAT terminal, it allows workers to video call their loved ones to stay connected even if they are located at remote oil rigs, far from home.

Satellite communication systems are vital for enhancing a huge range of routine operations in oil and gas. For example, they can deliver high-definition video footage of ocean floor drilling activities or use seismic exploration sensors to map subsurface drilling sites to find resource-rich locations. More sophisticated solutions include digital twins, which are virtual models of physical assets that are updated in real time with the help of IoT sensors. These digital replicas reduce risk by allowing technicians to test changes in a safe environment beforehand.

IoT also improves asset management. Facilities like drilling rigs, offshore oil rigs, and pipelines consist of numerous moving parts, all of which need routine monitoring and maintenance. With a fully connected infrastructure, companies can manage the lifecycles of their assets more efficiently, improve information management, and proactively guard against risks associated with unscheduled downtime.

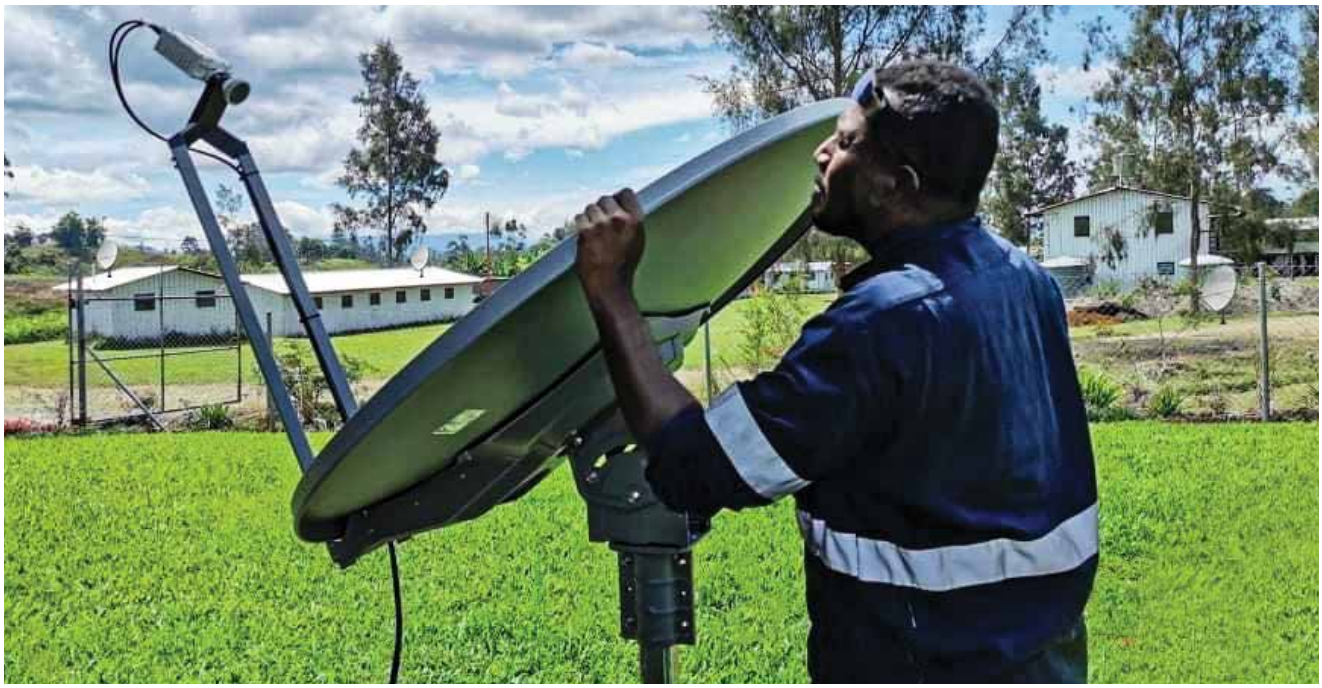
Check out Kacific Offshore Connectivity which provides comprehensive and cost-effective bandwidth offshore with speeds of up to 50Mbps for consistent communications that is scalable across many stations.



Using satellite broadband connectivity for redundancies

While the benefits of satellite broadband in the oil and gas industry are without doubt, it is not without its limitations. The most noteworthy of these is high latency rates, which are due to the satellites being in geostationary orbit 35,786 km above the Earth. Latency rates of between 500 and 600ms are to be expected. That said, more recent innovations, such as Kacific1's high-throughput spot beams mean that bandwidth is now far greater than it once was. Availability is better too, with average uptime between 99.1 and 99.9%, depending on weather conditions and antenna size. This makes the new age and next generation satellite internet is vastly more reliable and has far greater coverage than mobile networks.

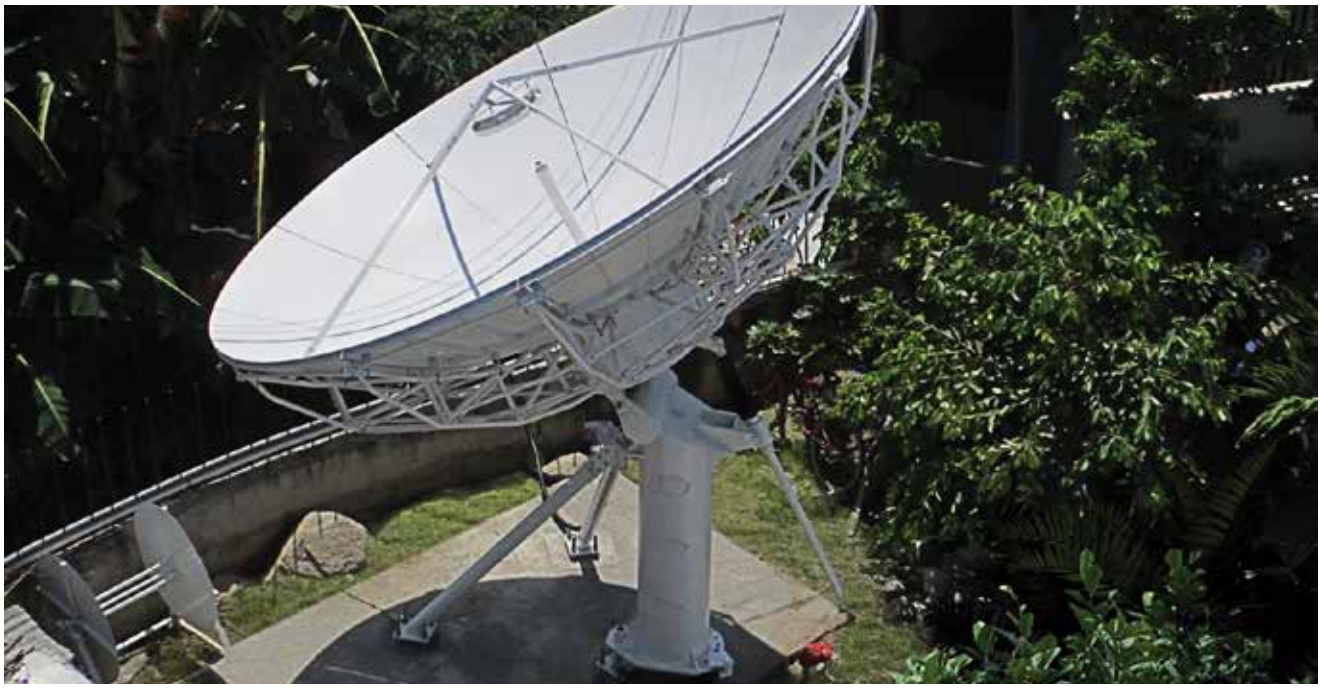
Another important advantage of geostationary satellites, like Kacific1, is that they have fixed positions in the sky, thereby allowing as few as three or four satellites able to provide near continuous global coverage. This means a simple, affordable, and power-efficient antenna is enough for a GEO satellite connection, with no moving parts for reception and transmission needed, making it substantially simpler and more affordable than tracking antennas for LEO/MEO satellites. Satellites placed in Geostationary Orbit (GEO) also offer a very stable and consistent service and user experience, and they allow operators to target specific areas where large amounts of bandwidth are required. For example, with Kacific FlexVNO, oil and gas customers can enjoy uncontended wholesale bandwidth across a large fleet of terminals. That means that your stations will always enjoy high-speed connectivity dedicated for you.



Low Earth orbit broadband satellites, such as those currently being rolled out by providers like Starlink and OneWeb, by contrast, move with respect to the ground. This means that a given satellite is only within view for a short time before any communications are handed off to another satellite. While latency is much lower owing to the reduced distances involved, this limitation presents some inherent reliability and coverage issues. Moreover, since dozens of satellites need to be in orbit to provide continuous global coverage, the costs and hence prices to end users are also higher in most cases.

Even in spite of the inherent drawbacks of satellite connectivity, there is still a strong case for using it even where faster, low-latency terrestrial solutions are available. In these situations, having a redundant connection delivered by satellite broadband can reduce risk by practically eliminating downtime. After all, an infrastructure failure or natural disaster can quickly render terrestrial systems useless, which can make it impossible to maintain communications with a remote site. Therefore, satellite broadband is crucial for ensuring the continuity of oil and gas operations, even if there are better solutions more immediately available.

Satellite broadband is also ideally suited to maintaining a hot-site backup of your systems and data. A hot-site backup is a real-time replication of an existing environment in which all data from the primary site is continuously updated. Furthermore, backup applications are typically not sensitive to higher latencies. By offering reliable round-the-clock connectivity, satellite broadband can keep your disaster-recovery site running and ready for use at all times. Kacific Fiber Backup is designed specifically for that purpose, allowing you to stay connected at all times, even if you do primarily use terrestrial broadband.Even in times of fiber cut or powerline failure, Kacific's back up will keep you and your business online with zero down time.



How Kacific can help drive innovation in the oil and gas sector

One of the biggest challenges facing the Asia Pacific oil and gas sector, is the environment itself. With many thousands of islands, many of which are extremely remote and have little or no existing broadband infrastructure, isolated facilities have long been limited by the lack of broadband coverage.

Kacific operates geostationary broadband satellites to provide connectivity to up to 600 million people across the entire region. We are now able to provide the bandwidth required to support the oil and gas industry, and we provide and support a broad range of IoT applications, backup systems, and other solutions. The Kacific1 HTS technology allows re-using of the same spectrum multiple times, making the throughput much higher than traditional FSS satellites, which can only use the spectrum once. This results in greater spectral efficiency and lower cost per bandwidth.

The case for implementing satellite broadband to modernize oil and gas operations has never been stronger. As the sector continues to expand into more inaccessible regions of the world, reliance on this universal solution will only continue to grow. In that sense, modern satellite communications are now well-established as the vanguard of innovation in a sector that has for too long struggled to modernize.

Kacific is a next-generation broadband satellite operator providing coverage throughout the Asia Pacific region. We are committed to providing the latest in universal, high-quality, affordable satellite broadband to the finance sector.

Contact us today to find out more.

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