

Picture this -

An offshore Energy site in the middle of the ocean, seamlessly connected to its onshore headquarters on the other side of the world, transmitting real-time data and maintaining constant, high-quality communication.

Or a worker at that same location, making a high definition video call to their loved ones back at home.

This isn't a dream of the future; it's happening right now, thanks to Low Earth Orbit satellite networks like Starlink and OneWeb, and the emergence of private 5G networks.

Driving Energy Sector Innovation with LEO & 5G



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A BRIEF INTRODUCTION TO CLARUS

- Formed in 2014 by Derek & Debra Phillips
- Business critical communications in some of the worlds most challenging environments:
 - Low Earth Orbit Satellite Communications
 - Starlink & Oneweb
 - Private 5G Networks
 - Bonded LTE Solutions
 - Cellular Coverage Technology
- Clients across Energy, Maritime, Construction, Utilities & Healthcare
- Includes EDF Energy, Valaris, Hughes Subsea, Hitachi Energy, Orsted, Balfour Beatty
- One of just a handful of distributors across the world to offer both Starlink & Oneweb



THE PROBLEM FOR REMOTE ENERGY SITES VSAT, SUBSEA FIBRE, MICROWAVE

- Geostationary satellites - 36,000km
- Lack of coverage, networks knitted together.
- Limited bandwidth meaning slow internet speeds, particularly at sea.
- High latency - more on that shortly.
- Weather disruption of satellite signals, cable breakages
- High infrastructure costs
- Line of sight issues
- Complex and expensive to maintain due to remote location

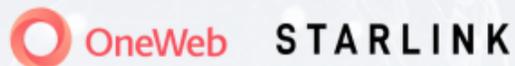
How can you address issues with productivity, operating / maintenance costs, health and safety, and crew welfare?





Low Earth Orbit Satellite Networks

Starlink and OneWeb - new high speed, low-latency satellite internet services, providing high speed internet access to even the most remote locations, anywhere in the world.



Private Mobile Networks

Private LTE and 5G technology offers enterprises a more cost-effective, higher-quality wireless data connectivity option in comparison to WiFi. Perfect for environments that require low-latency IoT connectivity, such as offshore wind farms.



SATELLITE NETWORKS, LATENCY AND WHY IS IT SO IMPORTANT?

- Components of a satellite network
- Latency - the time it takes for information to pass from one point to another, measured in milliseconds
- Geo - approx 36,000km - 600ms latency - physics
- High latency affects can mean:
 - Delays in data transmission - problematic for real time applications such as video, voice and SCADA
 - Delays in execution of remote control commands to machinery impacting efficiency and safety
 - Synchronisation issues
 - IoT processing delays reducing efficiency and effectiveness of monitoring devices





LEO SATELLITES: A GAME CHANGER FOR THE ENERGY SECTOR

- Starlink & OneWeb as leading players
- Thousands of low cost satellites in low earth orbit
- Leo - approx 550km to 1200km
- Latency of 20-40ms - more on benefits shortly
- Orbiting the earth continually proving global coverage
- Even the the most remote oceans of the world
- Up to 350Mbps download / 40Mbps Upload speeds
- Gigabit coming
- High performance, low cost antennas
- Phased array technology
- Small footprint





LEO SATELLITES: THE BENEFITS

Starlink & OneWeb are paving the way for a new generation of technologies, bringing huge leaps in productivity, safety, cost reduction, and quality control.

The increased bandwidth and global coverage offered by Starlink ensures that remote sites can have fully connected teams and devices, working collaboratively within the same network and files.

- Seamless connectivity anywhere in the world - even the most remote locations
- Faster, near to real time data transmission
- Enhanced communication and collaboration
- Improved automation and data analytics
- Increased efficiency and safety
- More sustainable as tasks can be carried out remotely
- Reduced operational costs
- Improved welfare of staff





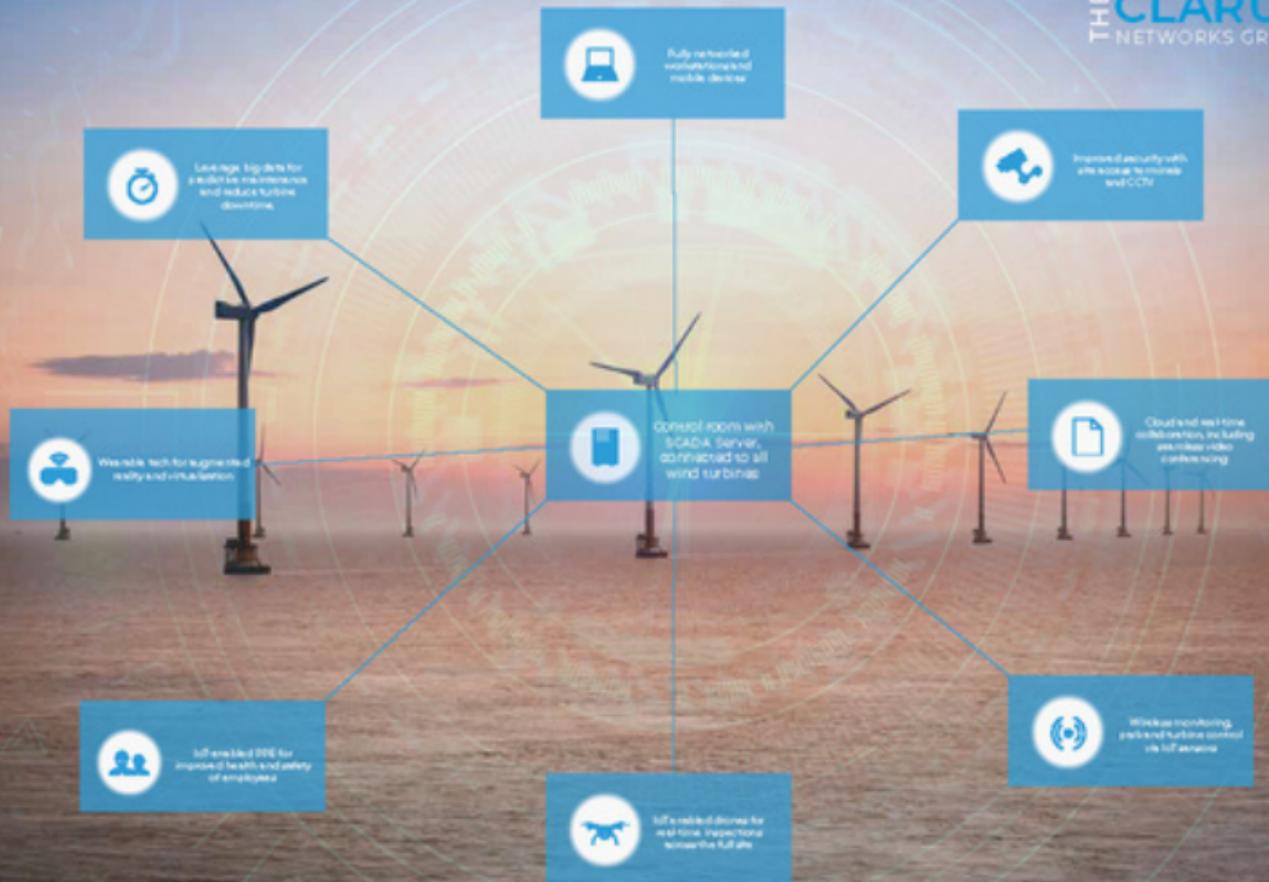
COMBINING LEO WITH PRIVATE MOBILE NETWORKS

- What is a Private 5G Network?
- Customised, secure, high capacity wireless data network
- Dedicated infrastructure for specific use cases.
- Uses licensed spectrum
- Can be a stand alone network
- Often fibre is used as backhaul
- However works exceptionally well with Starlink & Oneweb
- Enhanced Communication
- Real time monitoring
- Remote control
- Predictive maintenance
- Health and safety

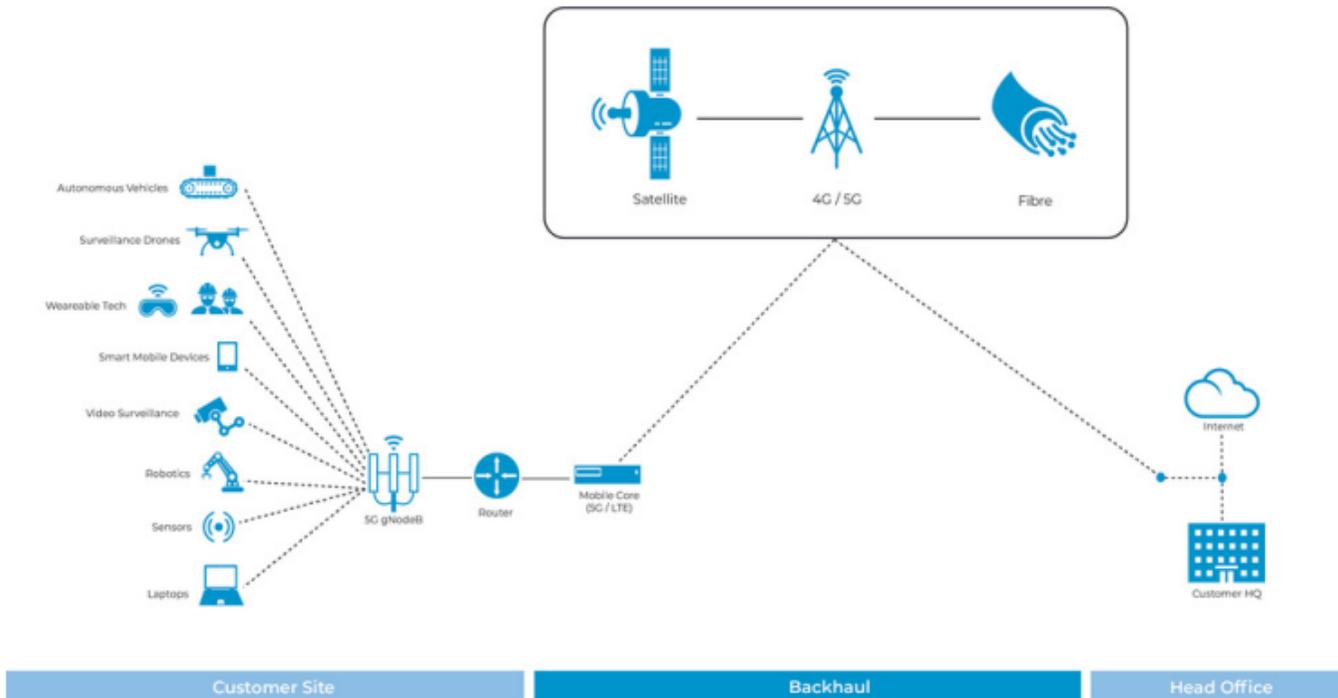


HOW DOES IT COMPARE TO WIFI?

- Speed and latency
- Range and coverage - many miles
- Deployment and infrastructure - although more complex to plan, far less access points required.
- Security and reliability - secured by sim, stronger encryption and authentication mechanisms
- Better suited to industrial applications, large scale IoT deployments and mission critical communication.



SITE-WIDE PRIVATE 5G NETWORK - EXAMPLE



CASE STUDIES - LEVERAGING LEO AND PRIVATE 5G NETWORKS

DON'T JUST TAKE OUR WORD FOR IT

- U.S. Department of Energy - Power plant 30% maintenance cost reduction by replacing manual inspections
- Kauai Island Utility Cooperative - reduced oil consumption by 1.6b gallons per year; achieved goal of 50% renewable energy
- Ericsson - remote monitoring of wind turbines led to 30% maintenance cost reduction
- SpaceX - recovery fleet throughput increased 5900%, reduced costs by 70%



“Starlink Maritime has vastly improved the efficiency of our offshore internet speeds by a factor of approximately 250-300x. Hughes Subsea is dedicated to being early adopters of the latest technological innovations to increase productivity and remain at the forefront of the competition within the offshore renewable and oil and gas sectors.”

HUGHES SUBSEA

“We are thrilled to announce that Clarus Networks has successfully installed Starlink Maritime on the Valaris 121 Jackup rig, marking a significant milestone in our collaboration. This cutting-edge satellite internet system brings unparalleled benefits to the oil and gas sector and the broader energy industry.

After months of meticulous planning and coordination, the Valaris 121 rig is now the first in the fleet to be equipped with this exceptional service. With the system live and delivering outstanding results, we are excited to continue our work in installing Starlink Maritime across the rest of the Valaris fleet.

VALARIS



"Low Earth Orbit satellite networks like Starlink and OneWeb, coupled with private 5G networks, are transforming the energy sector by providing unparalleled connectivity, speed, and reliability.

By embracing these technologies, we can revolutionize the way we produce and manage energy, optimize operations, and ensure the safety of our workers.

The future of the energy sector is connected, and it's happening right now!"

DEREK PHILLIPS
MANAGING DIRECTOR
CLARUS NETWORKS



A photograph of an offshore wind farm at sunset. The sky is a mix of orange, yellow, and grey, with clouds. Several wind turbines are visible, silhouetted against the sky. In the center, there is a large offshore platform or rig. The water is dark and calm.

Thank You

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