

The Imperatives of the Technology Hybrid for the First & Last Mile



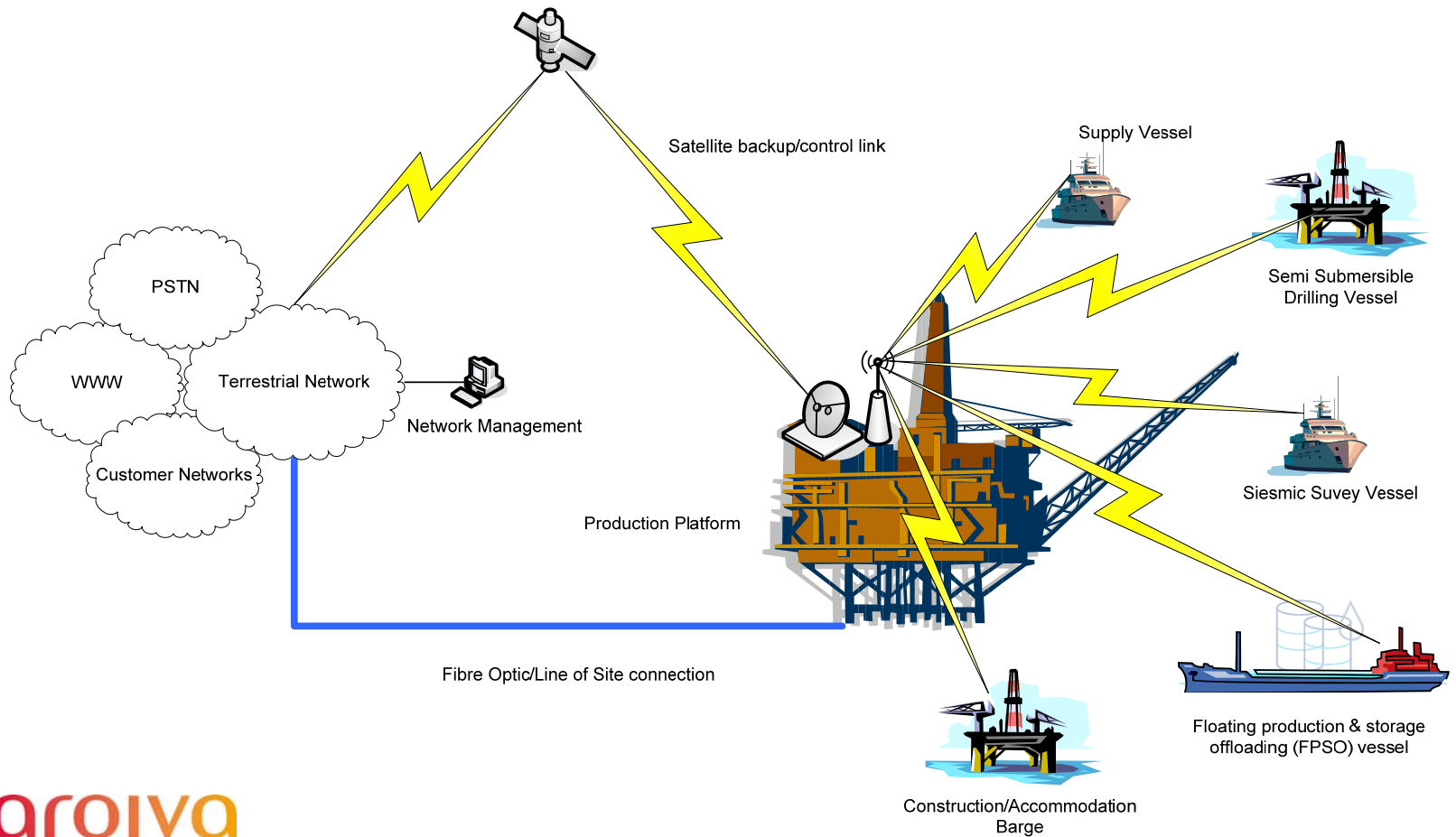
Oil & Gas Communications: Europe

Communications in the North Sea – The opportunity

- Flexible first and last mile broadband connectivity in the North Sea
- Connectivity to enable temporary or floating installations and vessels to easily connect into corporate networks
- Resilient wireless broadband service to reduce costs
- An alternative to more traditional stabilised connectivity
- Increased communication capabilities to smaller support vessels
- Extension of corporate/welfare services to support vessels
- Capability to provide cost effective temporary connections to 3rd parties

Wireless Utopia

Typical Offshore WiMax Hotspot Configuration



Wireless Access Technologies – The choice

- Existing services are recognised as being limited and often costly
- Land based systems are capable of being utilised in the North Sea
- WiMax is a viable alternative
- 3G and Long Term Evolution (LTE) solutions possible but problematic with LTE deployments not proven
- Outsourcing of services by Oil & Gas industry creating opportunities to challenge traditional approaches
- Spectrum availability will impact solutions provided by service providers

Challenges of Spectrum Availability

- Offshore communications and regulatory controls vary
- UK sector spectrum IS regulated
- LTE and WiMax access technologies may utilise common frequencies
- Unlicensed bands at 5GHz feasible but range and service coverage will be impacted
- Most likely band for WiMax use potentially 2.3Ghz/2.6Ghz
- Increased flexibility to use any access technology within multiple frequency bands provides increased scope to migrate to new access technologies when appropriate