Smart IoT Solutions for Offshore & Onshore Oil & Gas Operations

Transforming the industry with ATEX-certified technologies for hazardous environments

The Digital Transformation Imperative

The oil and gas industry faces unprecedented challenges that demand innovative solutions:

Safety Concerns

Hazardous environments demand constant vigilance to protect workers and assets in potentially explosive atmospheres

Operational Inefficiencies

Manual processes and legacy systems create bottlenecks, increasing costs and limiting productivity

Environmental Compliance

Increasingly stringent regulations require precise monitoring and documentation of emissions and potential leaks

Remote Asset Management

Dispersed operations across challenging terrains complicate maintenance and oversight efforts

Today's Agenda

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IoT Fundamentals for Oil & Gas

Core technologies and ATEX certification for hazardous environments

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Communication Technologies

LoRaWAN, NB-IoT, and Satellite IoT for comprehensive coverage

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Critical Use Cases

Real-world applications across offshore and onshore operations

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Deployment Environments

Implementation across diverse operational settings

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System Architecture

End-to-end integration from sensors to insights

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Benefits & ROI

Tangible outcomes and strategic advantages

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Implementation Roadmap

Steps to successful digital transformation

ATEX Certification: The Foundation of Safe IoT

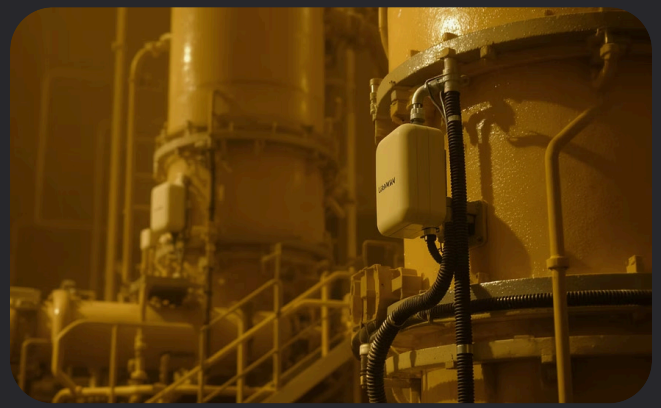
All our IoT devices are designed specifically for hazardous environments with full ATEX certification:

- Certified for deployment in Zone 1 and Zone 2 explosive atmospheres
- Intrinsically safe design prevents ignition sources
- Ruggedised for extreme conditions (-40°C to +85°C)
- IP68-rated enclosures for dust and water protection
- Compliant with IECEx international standards
- Independently tested and verified for explosive gas atmospheres

⊗ Deploying non-ATEX certified equipment in hazardous areas violates safety regulations and creates serious explosion risks

Multi-Protocol Communication Technologies

Our solutions leverage complementary wireless technologies for seamless coverage across all operational environments:



LoRaWAN

- 15+ km range in open environments
- 10-year battery life potential
- Ideal for dense sensor networks
- Private network options for security
- Optimised for industrial zones

NB-IoT

- Leverages existing cellular networks
- Superior indoor/underground penetration
- Carrier-grade security protocols
- Low power consumption design
- Global roaming capabilities

Satellite IoT

- Truly global coverage
- No terrestrial infrastructure needed
- Ideal for offshore platforms
- Resilient during emergencies
- Low-bandwidth optimised protocols

Critical Use Case: Pipeline Integrity

Challenges:

Pipeline networks spanning thousands of kilometres face corrosion, third-party damage, and environmental stresses that can lead to catastrophic failures.

IoT Solution:

Continuous Pressure Monitoring

ATEX-certified pressure transducers detect subtle changes that indicate potential leaks or blockages

Acoustic Leak Detection

Ultrasonic sensors detect the acoustic signature of escaping fluids, enabling precise leak localization

Cathodic Protection Monitoring

Real-time monitoring of corrosion prevention systems ensures pipeline integrity is maintained

Automated alerts trigger immediate response protocols when anomalies are detected, preventing minor issues from becoming major incidents.

Critical Use Case: Gas Detection & Air Quality

Our multi-gas detection systems provide comprehensive monitoring of potentially hazardous gases across facilities.

Hazardous Gas Monitoring:

Hydrogen Sulfide (H_2S)

Deadly at 100 ppm, requires immediate detection and response

Methane (CH_4)

Explosion risk and greenhouse gas requiring constant monitoring

Carbon Monoxide (CO)

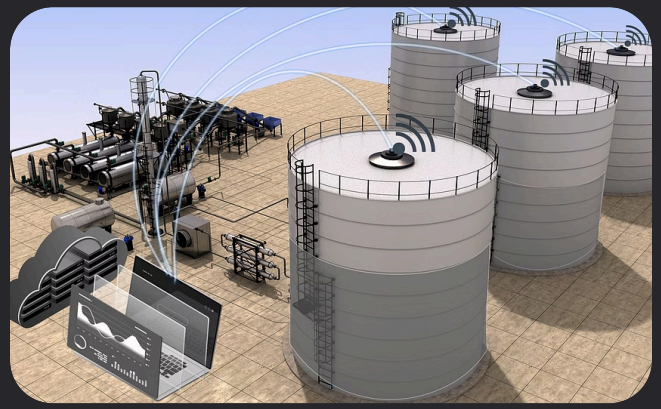
Silent killer produced during incomplete combustion

Volatile Organic Compounds

Health hazards and regulatory compliance concerns

Our systems feature automatic calibration, redundant sensors, and integration with facility safety systems for comprehensive protection and compliance documentation.

Critical Use Cases: Asset Monitoring & Safety



Tank Level & Temperature

- Non-contact radar level sensors
- Temperature stratification monitoring
- Overfill prevention alerts
- Inventory reconciliation

Equipment Predictive Maintenance

- Vibration analysis sensors
- Motor current signature analysis
- Thermal imaging integration
- AI-driven failure prediction

Worker Safety & Location

- Personal gas monitors with location
- Man-down detection
- Geofencing for hazardous areas
- Emergency evacuation management

Each solution is designed for the specific challenges of hazardous environments, with intrinsically safe construction and redundant safety features.

Offshore-Specific Solutions

Unique Offshore Challenges:

- Harsh marine environments with salt spray and extreme weather
- Limited connectivity options
- Critical structural integrity concerns
- Higher safety risks due to evacuation challenges

Tailored Offshore IoT Solutions:

- Structural health monitoring with strain gauges and tilt sensors
- Wave and weather monitoring integrated with production data
- Helideck monitoring systems for safe helicopter operations
- Satellite-primary communications with redundant pathways
- Extended battery life designs (5+ years) to minimize maintenance

Environmental Monitoring & Compliance

Modern oil & gas operations require comprehensive environmental monitoring to ensure regulatory compliance and demonstrate environmental stewardship:

Emissions Monitoring

Continuous monitoring of flare efficiency, VOC emissions, and greenhouse gases with automatic regulatory reporting

Water Quality

Real-time monitoring of produced water quality parameters including hydrocarbon content, suspended solids, and pH levels

Soil Conditions

Early detection of hydrocarbon leaks into soil with distributed subsurface monitoring networks and smart remediation tracking

Automated Compliance

Streamlined reporting with auditable data trails, automated permit compliance verification, and early warning of potential violations

Deployment Environments

Our solutions are designed for seamless implementation across the full spectrum of oil & gas operational environments:

Remote Oilfields

- Harsh climate extremes (-40°C to +60°C)
- Limited infrastructure access
- Satellite & LoRaWAN hybrid networks
- Solar/battery power systems

Refineries & Processing

- Dense infrastructure environments
- Multiple hazardous zones
- High sensor density requirements
- Integration with existing systems

Tank Farms & Terminals

- Large geographic areas
- Critical inventory management
- Theft/security concerns
- Environmental containment monitoring

Each deployment is customised to the specific operational, environmental and regulatory requirements of the site.

Hybrid IoT Architecture

Our architecture prioritises reliability, security, and scalability through:

- Edge processing for critical safety functions
- Multi-layered cybersecurity protocols
- Redundant communication pathways
- Secure OT/IT integration frameworks
- Open API ecosystem for integrations
- Scalable from pilot to enterprise-wide deployment

Measurable Benefits & ROI

65%

Reduction in unplanned downtime

Through predictive maintenance and early failure detection across critical assets

43%

Decrease in safety incidents

By providing real-time hazard detection and worker location information

28%

Lower maintenance costs

Through condition-based maintenance replacing calendar-based schedules

87%

Faster leak detection

Reducing environmental impact and product loss through immediate alerts

Based on analysis of 36 customer implementations across upstream, midstream and downstream operations over the past 3 years.

Implementation Roadmap

Our proven methodology ensures successful deployment of IoT solutions in even the most challenging environments:

Site Assessment & Planning

Comprehensive evaluation of hazardous zones, connectivity options, integration requirements, and business objectives

Pilot Deployment

Small-scale implementation with rigorous testing in actual operating conditions to validate performance and ROI

Scaled Implementation

Methodical rollout across facilities with continuous optimisation and integration with existing systems

Operations Integration

Embedding IoT insights into operational workflows and decision processes with comprehensive training

Continuous Improvement

Ongoing analysis of performance metrics, regular security updates, and technology refreshes

Typical timeline from initial assessment to full implementation ranges from 4-12 months depending on scope and complexity.

Transform Your Operations Today

Join the growing number of forward-thinking oil & gas operators leveraging ATEX-certified IoT technologies to:

Enhance Safety

Protect your most valuable assets—your people—with real-time hazard detection and response

Boost Efficiency

Optimise operations through data-driven insights and predictive maintenance

Ensure Compliance

Stay ahead of regulatory requirements with comprehensive monitoring and reporting

Contact our team today to schedule a consultation and site assessment