CRESCENT
TECHNOLOGY

Lightweight Membrane Sensor System

Revolutionizing Monitoring for Oil & Gas & Beyond

Passive & Active Wireless Sensors for Harsh, Remote, and High-Risk Environments

crescentglob.com

What is the Lightweight Membrane Sensor System?

Dual Sensor Types

Passive (RFID-based): Battery-free, powered by readers.

Active (Thin-film piezo): Embedded, low-power, onboard battery.

Key Features

- Ultra-lightweight (~85g), compact (20mm)
- Wireless, modular, no wiring
- Extreme environment support (-50°C to +85°C)
- Real-time AI-based insights

Oil & Gas Use Cases

Transforming Monitoring in Harsh Oil & Gas Environments

Pipeline Health Monitoring

Crack & wall thickness detection

Underground/underwater corrosion sensing

Facility Safety

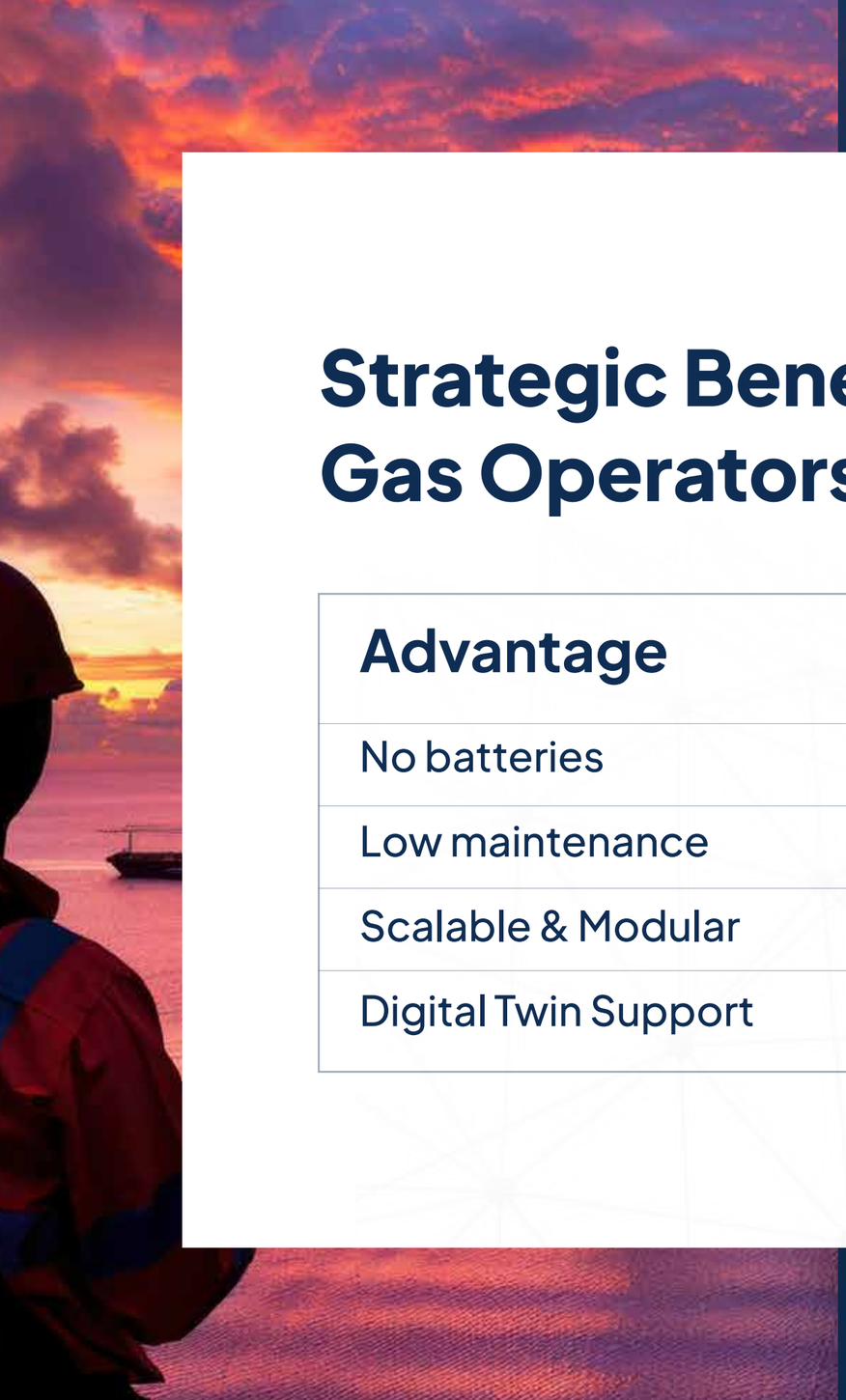
Valve/joint bolt looseness alerts

Smart leak & pressure detection

Remote Asset Integration

Works with SCADA systems (ATL refineries / KSA oil fields)

Supports predictive maintenance (digital twin-ready)



Strategic Benefits for Oil & Gas Operators

Advantage	Why it Matters
No batteries	Safer in high-risk areas (e.g., offshore rigs)
Low maintenance	Ideal for remote, harsh desert or marine sites
Scalable & Modular	Easy deployment across large networks
Digital Twin Support	Enables predictive maintenance, reduces downtime

Broader Use Cases Across Industries

Smart Infrastructure & Industrial Operations

Infrastructure / Smart Cities

Bridge & highway strain/crack detection
Smart building maintenance

Industrial Monitoring

Factory asset & equipment health tracking

Transportation

Rail system wear/stress monitoring

Aerospace & Defense

Aircraft / UAV structural health

Healthcare (Future)

Lightweight wearable sensors for remote health diagnostics

Broader Use Cases Across Industries

Transportation

Railway axle, track, and bolt health monitoring

Infrastructure / Smart Cities

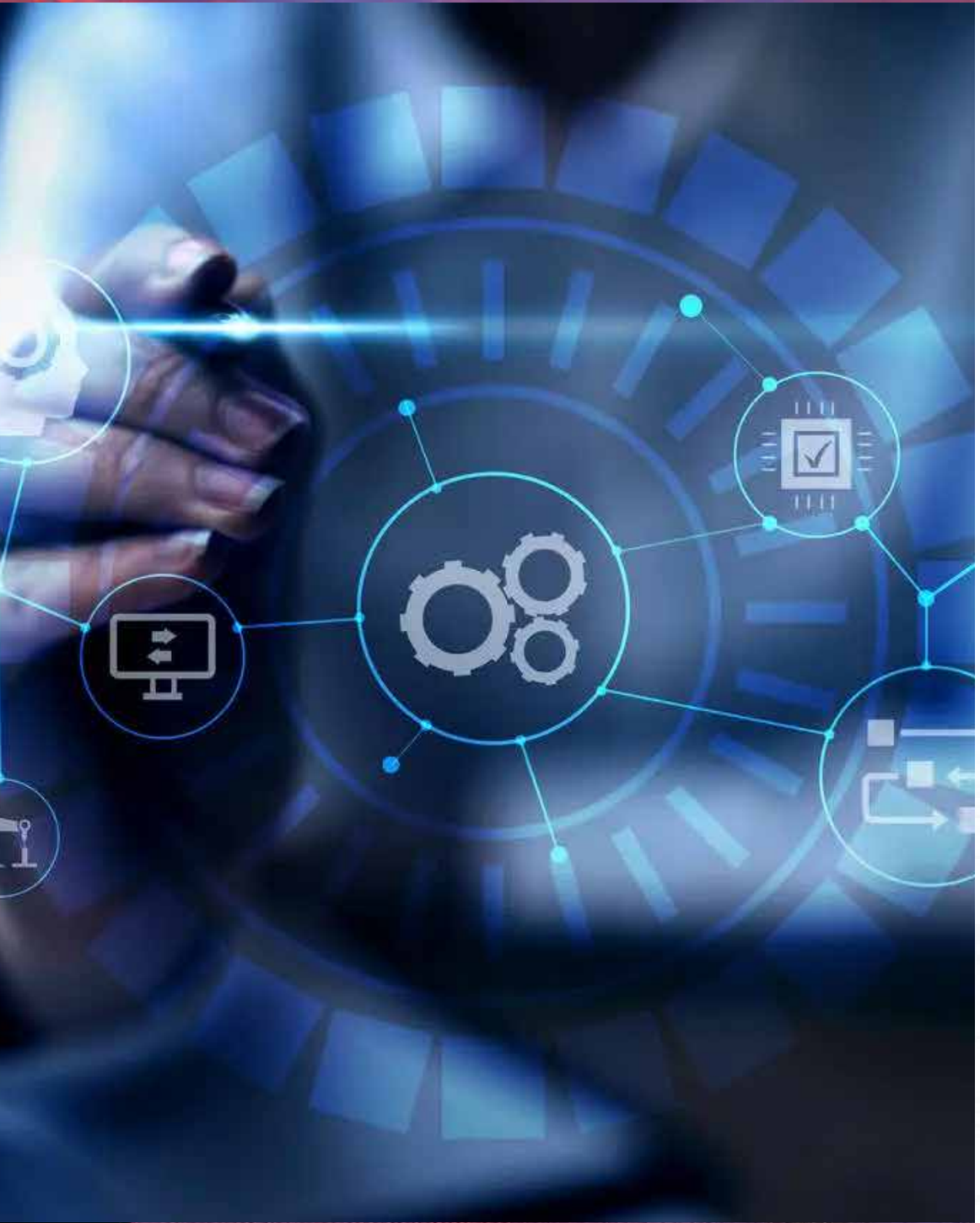
Bridge, tunnel & highway condition monitoring

Chemical

Factory equipment vibration, crack & temperature tracking

Aerospace & Defense

Aircraft and UAV structure wear detection



How the Membrane Sensor System Works

How It Works

- Uses ultra-thin sensors attached to surfaces like pipelines, bridges, trains
- Passive sensors (no battery) harvest energy from RFID or wireless signals
- Active sensors use onboard low-power chips for continuous data

Where It’s Used

- Railways, bridges, pipelines, aircraft, refineries, smart buildings
- Sends wireless alerts for real-time monitoring & AI-based maintenance