



Digital Industrial Transformation with Predix

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SUT

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O&G digital solutions



O&G Applications

Field Vantage* Smart Facilities BOP Sealytics Advisor Intelligent Pipelines* Production Max Response Max* Unified Operations Reliability Max*

APM

Machine & Equipment Health Reliability Management Maintenance Optimization
 Smart Signal System 1* Smart Signal Proficy Historian CSense Meridium

Wurldtech

Brilliant Factory



Cyber Security
Engagement Services

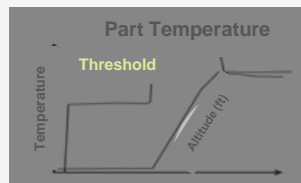
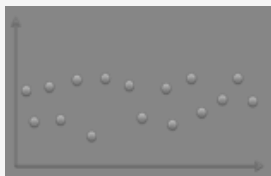
Predix and Industrial Analytics

Advanced Data Science



Physics-based

Applied Engineering



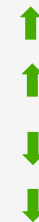
Data
Continuous,
accessible



Statistics
Identify trends
and anomalies



Physics
Apply asset
and domain
expertise



Industrial Outcomes

One platform for OT
and IT teams to
collaborate and
innovate

Big Data value drivers



FIELD VISIBILITY + PRIORITIZATION

Get to information quickly:

- Rank wells performance by KPIs
- Prioritize the actions that make the most impact



ANALYTICS

Optimization analytics:

- Look across all your wells - all the time
- Provide continuous optimization opportunities
- Provide automated operational recommendation



PREDICTION

Predictive analytics provide:

- 24/7 radar on your data
- Proactive warnings to improve planning & reduce unwanted downtime



COLLABORATION

Case management :

- A tool to enable cross functional collaboration.
- Field level data transparency to break operational data siloes .



FIELD-WIDE OPTIMIZATION

Configurable KPIs empower you to optimize the balance of

- Production
- Power,
- Equipment run life
- People and resources.

Subsea applications

- **Visibility into the status and health of Subsea Production Systems**

Status of “the oil” as it transitions to surface

- Advanced Flow & fluid modelling to optimise production
- Flow Assurance (blockages)

Health of the Infrastructure

- Erosion/Wear prognostics
- Calibration/Adaptive configuration

Optimised operations

- Guided & audited operating procedures



Diagnostics

TECHNOLOGY – SUBSEA SENSING

- **One monitoring system for:**
 - Subsea Leak Detection
 - Vibration Monitoring
 - Machinery and process monitoring
- **Stand-alone & non-intrusive**

LEAK DETECTION

- Early detection
- Wide area coverage
- Directional
- High sensitivity

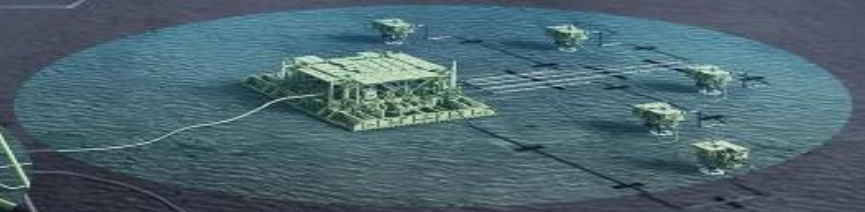
VIBRATION DETECTION

- Early detection
- Structural, Flow lines, Riser

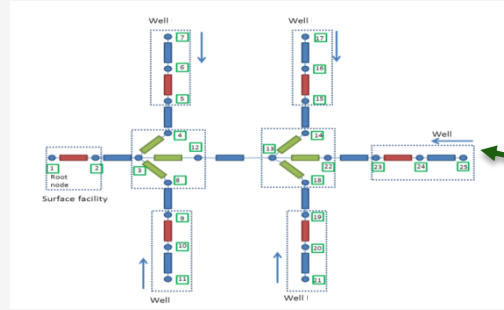
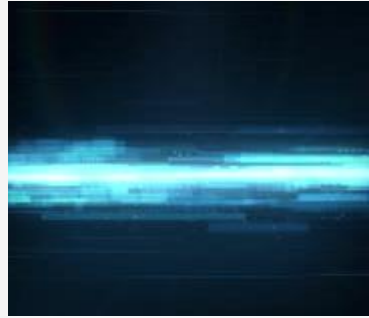
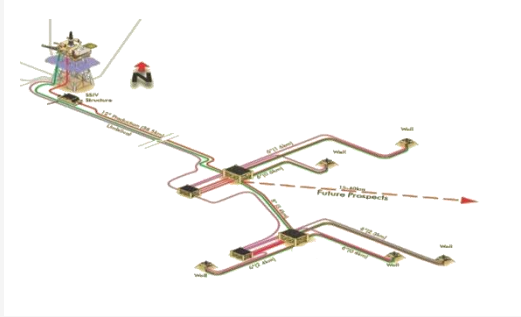
MACHINE & PROCESS MONITORING

(Compressor, Pump, Transformer, ...)

Acoustic & Electric monitoring
Continuous & synchronous
Early detection of changes/faults



Flow MonitoringVFM



Asset Models
& Model Network

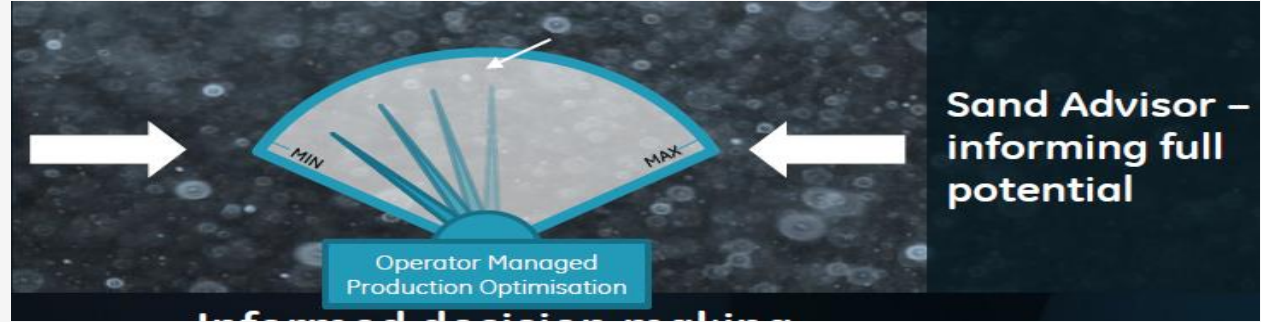


Modelling the **flow of production** as it transitions to the facility

Provides intricate visibility of the **whole production network**
(not just key points where flowmeters are installed)

Calculating a **live view** of the **composition** (oil:gas:water) and **flow**

Predictive and Prognostics



Predicting and avoiding asset degradation (erosion, fatigue, stress)

- **Accurate degradation models:**
- **tune down (avoid damage), or tune up (increase production)**
- **Sensor health**
- **Actuator health**
- **Chemical injection management**

Summary and Recap

Data science + equipment knowledge result in most impactful big data strategies.

Subsea equipment lacks standardisation (fleet scale) and rich instrumentation infrastructure further complicating big data applications in subsea

Deep understanding of component level failure modes is critical to develop predictive algorithms

Recent advancements in sensor technologies have enabled accurate flow modelling and asset assurance strategies

Thank you