

FUTURE

Future of Midstream: “Analytics, data lakes, IIoT and automation cutting through the jargon for a sustainable future.”

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Agenda

- **Where is the industry now?**
- **Technologies & Business Outcomes**
- **Possibilities & Outcomes**

Where is the industry now ?

*Regulatory
Compliance*

*Budget
Constraints*

*Operational
& Maintenance
Efficiency*

Sustainability

*Safe &
Reliable
Operations*

2000

2010

2020

2030

2040

Have the goals really changed ?

Deliver O&G safely & reliably:

- ✓ **Putting safety of people, process & environment first**
- ✓ **Investing in reliability & integrity**
- ✓ **Continuous improvement & operational efficiency**
- ✓ **Regulatory compliance**

So what is “New” ?



Current Situation

- Midstream is going through a rapid expansion due to drilling and upstream expansion
- IT and OT convergence continues to impact operations
- Budget constraints and reductions in IT spend are putting pressure on OT to embrace digitization and usage of IT standards and technologies

Jargon:

- ✓ “Special words or expressions that are used by a **particular profession** or group **and are difficult for others to understand**”

Cloud

*Predictive
Analytics*

Mobility

*Digital
Twin*

*Digital
Transformation*

*Industrial
IoT
Industry 4.0*

*Artificial
Intelligence*

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Some IT technologies coming to OT

- 2FA (2 Factor Authentication)
- MFA (Multi Factor Integration) into mobile platforms as part of 2FA
- SSO (Single Sign On) of external applications integrated via cloud
- Docker containers vs. virtualization
- Private cloud implementation of critical systems
- Digital twin
- Data lakes and warehouses
- Analytics, primarily cloud based
- Cloud based acquisition of data

Technologies coming from **other directions**

- Drones
- Smart and mobile technology integration
- Augmented reality
- Embedded sensors
- Inline robots/smart pigs
- Ultrasonic inspection on smart pipeline assets connected to SCADA systems
- Artificial intelligence
- Applications at the Edge

Systems that are moving to the **cloud entirely**

- CIS - Customer Information System
- RIM -Records & Information Management
- EAM - Enterprise Asset Management System
- GIS - Geographic Information System
- Mobile Workforce Management

Moore's law defines the speed of change for every industry.

It's the rule that defines that the processing power of a computer chip constantly increases, while the cost collapses at an exponential rate — and that speed of change is coming to drive the speed of innovation in every single industry as we all become tech companies.

“Companies are having to innovate and transform at a pace never seen before.”

Jim Carroll - Futurist, Keynote Speaker, Business Trends & Leadership Expert

What's next and how do we get there?



MARKET PROBLEMS

- ✓ CapEx/OpEx constraints
- ✓ Long-cycle ROI
- ✓ Depressed gas prices
- ✓ Sustainability concerns



LEGACY PROBLEMS

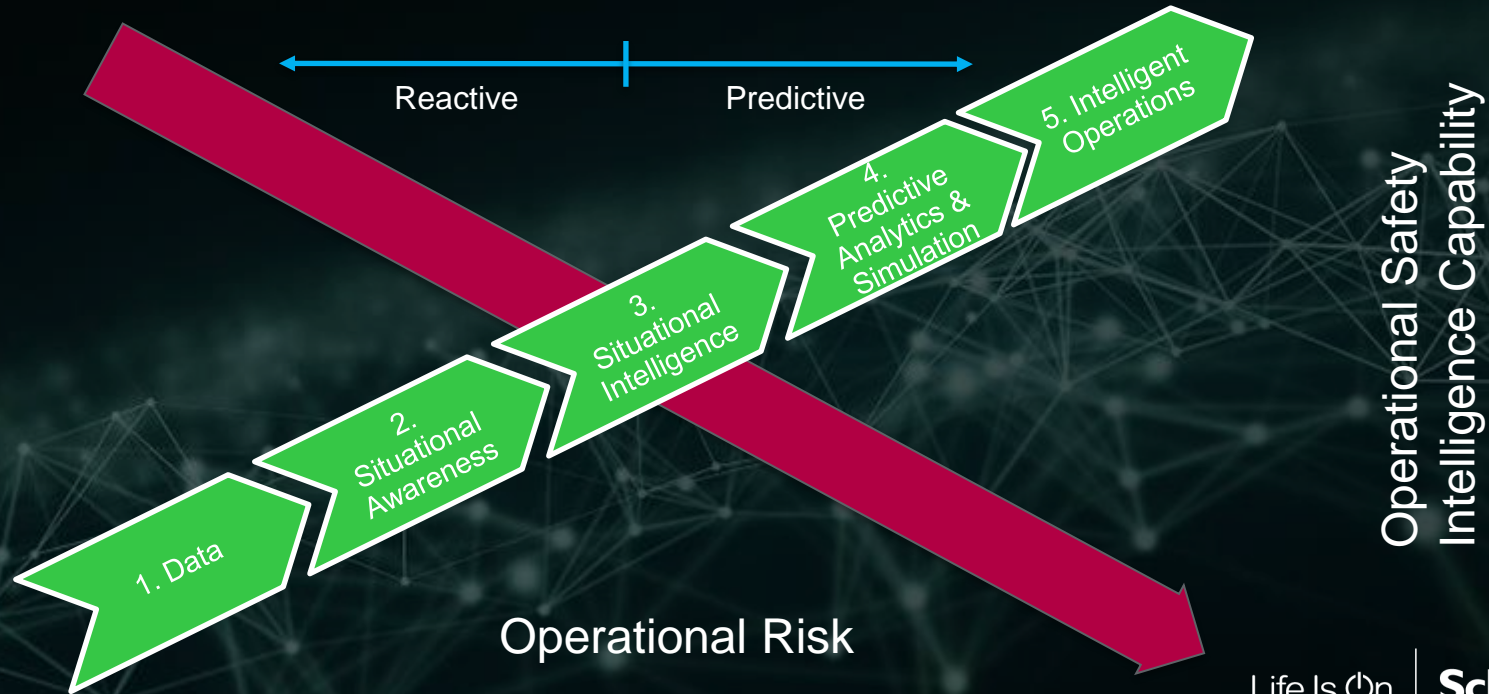
- ✓ Ageing infrastructure
- ✓ Siloed systems cybersecurity
- ✓ Field worker safety & automated workflows
- ✓ Reliability & costs containment



DIGITALIZATION CHALLENGE

New technologies are available, **BUT** the industry needs to invest in innovative and integrated digital transformation efforts.


How do we determine where we are in the OT journey to transform 'data' into "intelligence" and leverage these emerging technologies ?




Build innovation in **at every level**

- ✓ Cultivate new and different pools of talent
- ✓ Drive digital deployment from the boardroom
- ✓ Address common challenges together
- ✓ Build on existing workflows
- ✓ Balance aspirations and needs


..then Embrace Digitization as enabler and focus on business and operational outcomes




Optimized Engineering



Safe & Efficient Operations



Empowered Workforce



Reliability of Assets

...and create the right **environment** for that innovation

- ✓ Create safe spaces to try new ideas
 - ✓ Reward failures in the safe space
 - ✓ Fail fast



What would the future look like as we move towards more **intelligent operations**?

- Zero accidents
- Zero downtime
- Zero asset failure with optimized risk vs. costs
- Integrated OT/IT cybersecure architecture (field to enterprise)
- Unified operations (single version of the truth)
- Measurable and quantifiable ROI on OT investments
- Lower transportation and energy costs
- Ever-increasing stock prices



Questions?

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