FRA "HYPE" TIL IMPLEMENTERING I NORGES STØRSTE INDUSTRIPROSJEKT

DIGITALISERING

Trond Stokka Meling, Teknisk Direktør i Johan Sverdrup
1970’s: Mainframe computers to process seismic data

1990-2000: Tampnet - Subsea fiber optics for offshore installations, enabling big data transmissions

2005: Real time streaming of drilling data and monitoring in Real Time Center

1998-2003: Score project – common platforms for subsurface data, new IT-tools like 3D visualization rooms

2015: Åsgard subsea compression goes live

2015: Valemon on stream, partly unmanned operations from onshore Central Control Room

2017: Statoil Data platform goes live with the first data from Grane field

By 2025: AI, cloud, connectivity, high capacity computing, robotics
Digital opportunity driven by 3 technological enablers

- **Process digitalisation**: Reduced process lead time and manual human input for non-physical processes

- **Advanced analytics**: Improved understanding of large, complex and diverse data to enable more informed decision making

- **Robotics and remote control**: Improved reliability, reduced cost and increased safety by limiting human intervention in physical intensive activities
Digital technologies are undergoing rapid development which present significant opportunity for Statoil

-96%  x40  ~90%
Reduction in cost of data storage from 2005 - 2015  Increase in global data volume expected by 2025  of all data available today have been generated in the last 2 years

42%  20Bn+
Annual growth in IoT sensor market from 2016-2022  devices will be connected online (IoT) by 2020

Johan Sverdrup | The North Sea giant

80 – 90 Mill hrs  23 sites  3 MNOK/hr*  50 YRS

* 2016-2018
Johan Sverdrup | The digital flagship

Digital field development
- Always safe project execution
- SSI
- 20% reduction in engineering hours
- Up to 40% reduction in documentation

Data-driven operations and maintenance
- Best-in-class SSU and asset integrity
- Achieve PE >96%
- Reaching 30% reduction in total OPEX

Digital subsurface
- Make data driven decisions
- Revolutionise collaboration
- 50% reduction of waste in work process
- Reach 70% recovery factor

Digital drilling and well
- Reduced personnel exposure in red zone
- Prevent well control incidents
- 15-20% increased well construction efficiency

Production, process & energy optimization
Digital thread, Work process digitalization, automated supply chain
Data platform, data quality, data science, competence and software

All numbers are rough estimates to indicate the potential
A digital drilling system

- Digital plan
- Process Controller
- Drilling Control System
- Drilling Machines

- Realtime models / digital twin
- Dynamic Safety Triggers (Automatic action on incidents)
- Operational Envelopes (limits for safe operation)
- Automatic Machine Sequences (Operator does not need to focus on Machine Control)
- Optimization (Performance)

NOVOS is the link

- Consistent Execution
- Best Practices
- Well Program
- Drilling Intelligence and Optimization

Machine control

- Mud pulse communication
  - Rate 12 – 24 bps (bits per second)
- Wired drill pipe
  - Coaxial cable enables 57,600 bps
Well and reservoir optimization

Sub-surface data including PRM

Asset integrity management

Improved safety, security, environment

Sensor and inspection data

Process optimization

Well data

Un-manned concepts

Digital Project development

Project execution

Digital Collaboration

Engineer

Concept development

*PRM = Permanent Reservoir Monitoring
Aker Solutions’ KBeDesign™: Automated engineering in 3D and Analyses

KBeDesign™ Work Process

1. Analysis 2D model
2. De-idealizing and generating 3D KBE model
3. Automated detailing

KBeDesign™ Output

1. Design calculations/Node check reports
2. Updated global/local analyses
3. Automated drawing production
4. PDMS 3D
Aker Solutions’ Data Management: Johan Sverdrup

Tackling complexity through a Digital Twin data structure

Automatic and Continuous Data Quality Management
Fully Integrated Digital Twin - a game changer for Johan Sverdrup

Improved safety, security and environment, increased asset integrity control and reduced maintenance cost

Increased efficiency in commissioning, design and construction

Cross-discipline optimization using real-time simulation and visualization empowered by advanced data analytics

Increased short term production potential by process optimization

Increased accuracy of decision making by adding valuable well and reservoir knowledge, optimizing both short and long term production

Reduced CO₂ emissions and energy consumption

Increased accuracy of decision making by adding valuable well and reservoir knowledge, optimizing both short and long term production