Digitalization for O&G - Topsides 4.0
More efficient | More predictable | More reliable | Safer
The Industrial Evolution
Siemens has been at the forefront of every phase

Phase 1
Mechanical Production

Phase 2
Electrification

Phase 3
Automation

Phase 4
Digitalization

What level of maturity is your company?
Developing a digital roadmap via a collaborative approach to make your company more competitive
A Holistic Cyber Security Approach – More than the Sum of its Features
Everything we deliver is cyber secured

5 Levers of Cyber Security

- Plant security features
- Improved security processes
- Handling of incidents
- Security consciousness
- IT infrastructure

Siemens Industrial Cyber Portfolio

Consulting
- Cyber gap assessment
- Security program development
- Security architecture design

Securing the environment
- Endpoint handling
- Whitelisting deployment
- Secure remote access

Managed Services
- Anomaly detection
- Device and event monitoring
- Incident response

Testing the environment
- Vulnerability assessment
- Penetration testing
- Incident response planning
Topsides 4.0 – Integrated Solutions for O&G

Client Value Creation & Capture

- Designed for reduced CAPEX and OPEX
- Shorter project cycle time
- Enabled for remote operations with integrated automation and safety systems
- Shorter time to stable operation with virtual training and commissioning on the digital twin
- Lower OPEX with reduced staffing, predictive analytics, and integrated asset level optimization

Topsides 4.0 is our digital approach to rotating equipment, electrical & automation systems, and secure communications through the entire life cycle of the asset.
The Intelligent Digital Twin for Topsides 4.0

Data persistence

Digital Twin
Concept & FEED

- Configurators for fast, best practice designs
- Integrated EICT, designed for remote operations

Digital Twin
Design & Build

- Detailed design data
- Digital fabrication, virtual commissioning

Data Hub

- Process data
- Telecoms
- Fire & Gas
- P&IDs
- Equipment data sheets
- 3D drawings
- Automation System
- Instrumentation
- Electrical
- Isometrics

Intelligent Digital Twin
Operate & Maintain

- Service and maintenance data for asset management
- Analytics for operations and maintenance optimization
- Real time and historical asset generated data

Learning algorithms

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The Intelligent Digital Twin for Topsides 4.0

Value added applications

**Digital Twin Concept & FEED**
- Configurators for fast, best practice designs

**Process Twin**
- Process & automation testing, ops training, what-if scenarios
- Learning algorithms

**Plant Twin**
- Smart 3D view of Topsides facility for construction & maintenance planning, hazops, etc.
- Service and maintenance data for asset management

**Data Hub**
- Integrated EICT, designed for remote operations
- Detailed design data

**Intelligent Monitoring**
- Analytics and reporting for operational KPIs & equipment condition monitoring
- Analytics for operations and maintenance optimization

**OEM Services**
- Predictive diagnostics, asset & production optimization
- Real time and historical asset generated data

**Intelligent Digital Twin**
- Operate & Maintain
- Digital fabrication, virtual commissioning

**MindSphere**
- Digital Twins
- Conceptual design
- Operate & Maintain

*Siemens*
MindSphere – The cloud-based, open operating system for the Internet of Things – from Siemens

**MindApps**
- Apps from OEMs, from end customers, from partners and from Siemens
- Transparency in plants and analytical insights (e.g. fleet management)

**MindSphere**
- Open interface for developing customer-specific apps
- Different cloud infrastructures: AWS, SAP HANA, Microsoft Azure as public or private cloud or on premises (planned)

**MindConnect**
- Open standards for connectivity, e.g. OPC UA
- Plug & play connection of Siemens and third-party products
- Secure and encrypted data communication
## Digital Twin Example Savings For A Mid Size FPSO (100k bpd)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Duration/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce cycle time</td>
<td>12 wks saving in preparation of detailed design spec</td>
</tr>
<tr>
<td></td>
<td>8 wks shorter engineering phase on rotating equipment</td>
</tr>
<tr>
<td></td>
<td>4 wks faster to first oil</td>
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<tr>
<td>Reduce CAPEX</td>
<td>Optimized design at FEED stage</td>
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<tr>
<td></td>
<td>Reduced accommodation for offshore staffing</td>
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<tr>
<td></td>
<td>Flexibility and fewer changes with later start of EICT eng</td>
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<tr>
<td></td>
<td>Reduced risk from integrated control systems</td>
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<tr>
<td></td>
<td>Reduced client engineering and project management</td>
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<tr>
<td>Reduce OPEX</td>
<td>Reduced offshore Manning</td>
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<tr>
<td></td>
<td>Shorter and safer turnaround times</td>
</tr>
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<td></td>
<td>Early warning of performance degradation</td>
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</tbody>
</table>

Reduce cycle time: 3 – 9 months
Reduce CAPEX: $10 – 15 m
Reduce OPEX: > $100 m over 10 yrs

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**Total Savings:**

- **$100 m over 10 yrs**

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*Reduced © Siemens AG 2017*
Case Study: Ivar Aasen Field (AkerBP)

**Challenge**
- Mitigate integration risk
- Minimize offshore operational team
- Leverage onshore key expertise
- Condition monitoring to ensure asset uptime and efficient maintenance campaigns

**Solution**
- Fully integrated Electrical, Automation and Digital solution
- Onshore operations center for seamless remote operations
- Process simulation for virtual testing and training
- Automated condition monitoring of critical equipment
- Expert support based on real time data analytics

- Less people on the platform
- 30% savings
- Stable in 1 week
Our Digital Directive – Towards Partnership

Developing a Digital Roadmap…

…via a collaborative approach…

… to make your company more competitive.
Questions?