# Increased Rig performance through holistic information view

Presented by **Tore Bjerke**

**Aker**Solutions™

# This is Aker Solutions



**Employees: 21 500**

**Contract staff: 6 500**

**Revenues: 44.9 bn**

**EBITDA: 4.7 bn**

**Market Cap: 29.5 bn**

*Revenues and profits are in NOK and for 2012.*
*Market capitalisation as of 8 April 2013.*

- Provides oilfield products, systems and services for customers in the oil and gas industry world-wide
- Built on more than 170 years of industrial tradition
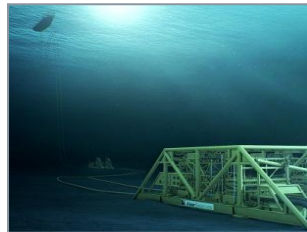- Employs approximately 28 000 people in more than 30 countries

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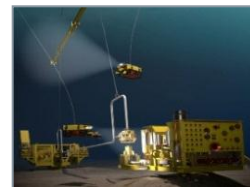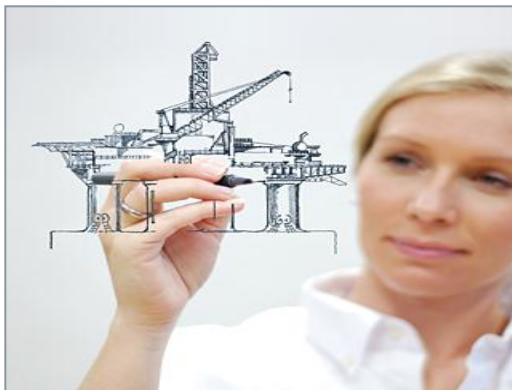
# Business areas

Engineering

Drilling technologies

Subsea

Umbilicals

Process systems
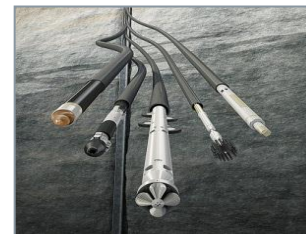
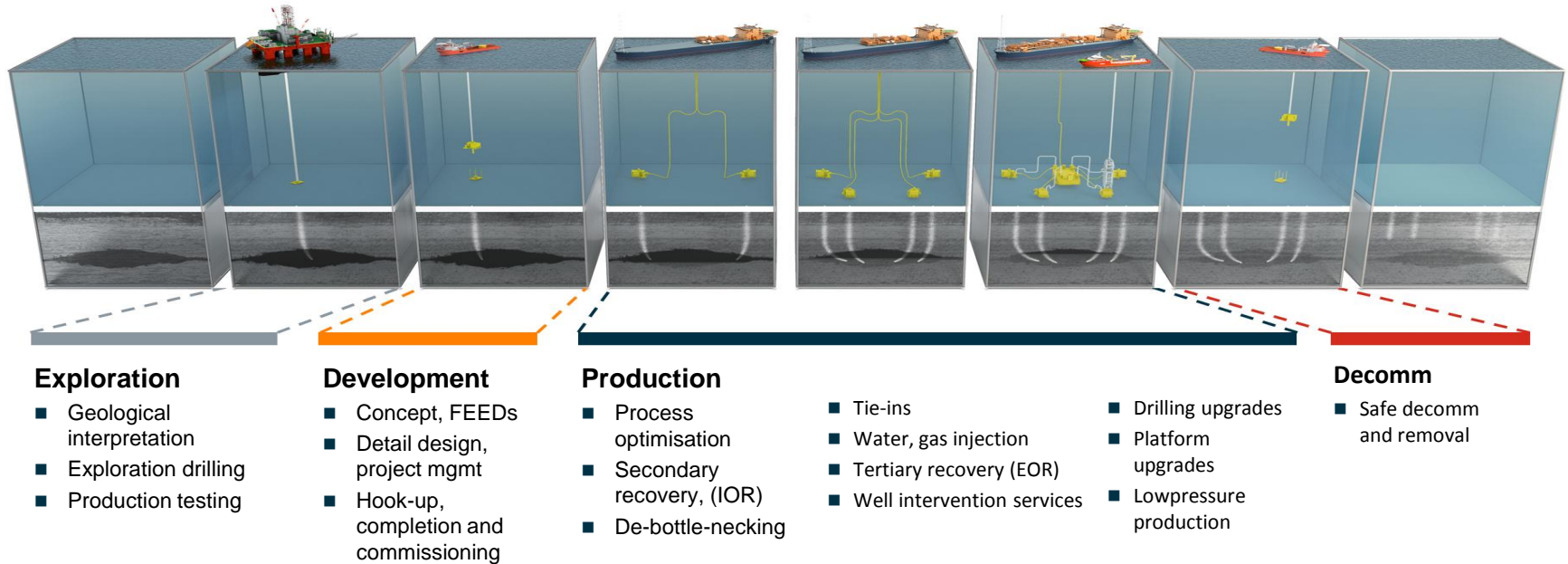Mooring and loading systems

Maintenance, modifications and operations

Oilfield services and marine assets

Well intervention services

# Through the life of a field

- Our knowledge and technologies span from reservoir to production, and through the life of a field.



### Exploration
- Geological interpretation
- Exploration drilling
- Production testing

### Development
- Concept, FEEDs
- Detail design, project mgmt
- Hook-up, completion and commissioning

### Production
- Process optimisation
- Secondary recovery, (IOR)
- De-bottle-necking

- Tie-ins
- Water, gas injection
- Tertiary recovery (EOR)
- Well intervention services

- Drilling upgrades
- Platform upgrades
- Lowpressure production

### Decomm
- Safe decomm and removal

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# The challenge

- Exploration at deeper water
- Harsher environment
- Increased demands on efficiency and security
- Ever increasing focus on HSE
- Changing contract regime
- Demand of increased operational stability – up-time
- Operational cost for a rig is high
- Move from calendar based to condition based maintenance
- Move from calendar based to continuous classing
- Crew development
- Demand for higher consistency in performance



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# The solution



Aker Solutions have, among others, developed two products to meet this challenge:
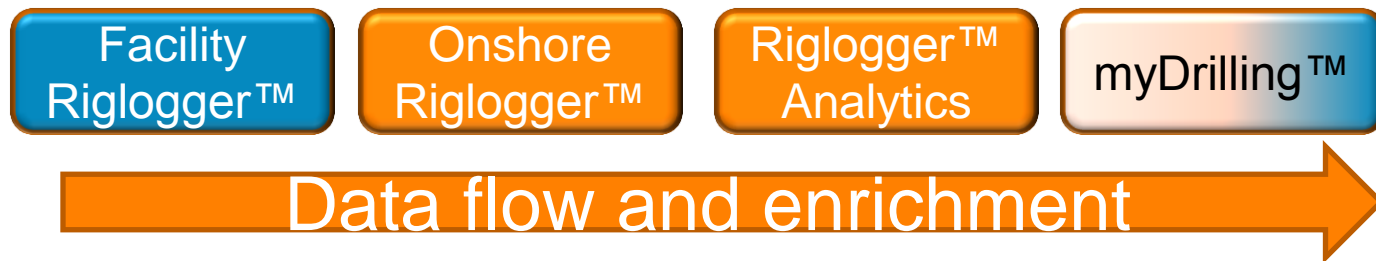
- Riglogger™
    - A high performance data collector from drilling equipment offshore consolidated onshore
    - Basis for:
        - Troubleshooting
        - Condition Monitoring and Condition Based Maintenance
        - Performance optimization
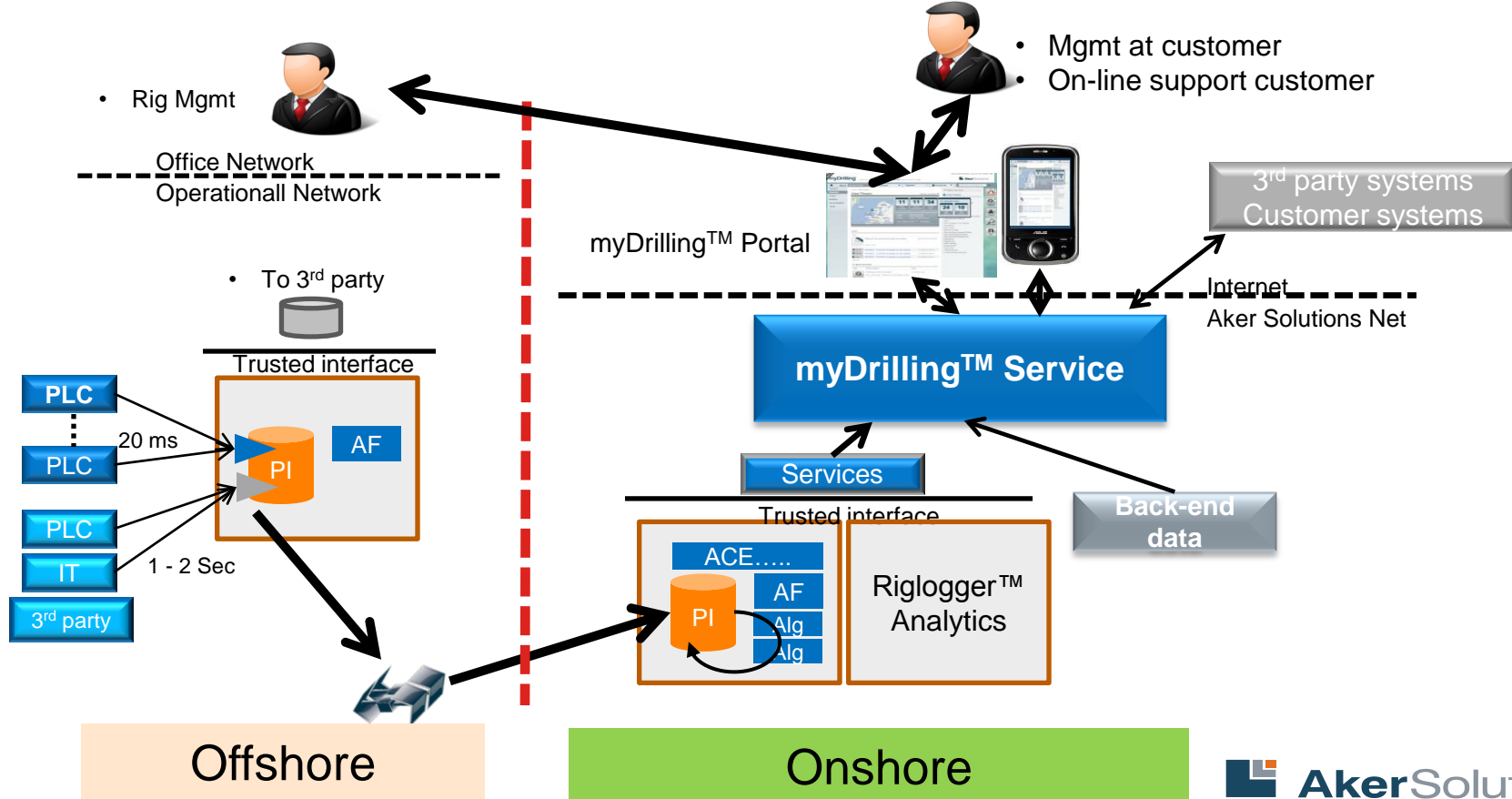        - Implemented on the PI System

- myDrilling™
    - An interactive web based customer and collaboration portal
    - Shows both operational and administrative information
    - Gives crew, onshore personnel and support the right information at the right time
    - Removes "noise"
    - Proven to be efficient and time-saving

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# From Riglogger™ to myDrilling™

Facility Riglogger™ · Onshore Riglogger™ · Riglogger™ Analytics · myDrilling™

Data flow and enrichment →

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# High-level architecture myDrilling™ and Riglogger™

- Rig Mgmt

- Mgmt at customer
- On-line support customer

Office Network
Operationall Network

myDrilling™ Portal

3rd party systems
Customer systems

- To 3rd party

Trusted interface

PLC

20 ms

PLC

AF

PI

PLC

IT

1 - 2 Sec

3rd party

Internet
Aker Solutions Net

**myDrilling™ Service**

Services

Trusted interface

Back-end
data

ACE…..

AF

PI

Alg

Alg

Riglogger™
Analytics

Offshore

Onshore

Aker Solutions™

part of Aker

# Facility Riglogger™

Ship server

Custom WEB service using AF SDK

TDL

**PLC**

PLC

PLC

IT

Any 3rd party

Facility Riglogger™

**GPS UDP**

Facts:
- Retrieves data from all PLC's
- Standard scan cycle 50 Hz
- Dead-band and compression
- Secure (password / anonymize / secure network)
- Possible to log any 3rd party system
    - All major interfaces supported
- Stores data for approx. 3 months
- No HA or resilience
- Detects changes in PLC software
- Signals "encrypted" offshore
- Special "TDL" interface to Ship-server (OPC or WS) at 1 to 10 Hz
- Requires approx. 256 KBs link
- Based on the PI System from OSIsoft
- No calculations performed offshore
- Comes in TWO versions:
    - Light - < 300 signals at max. 10 Hz; OPC based
    - Full - < 20.000 signals at 50 Hz; UDP based

# Central Riglogger™
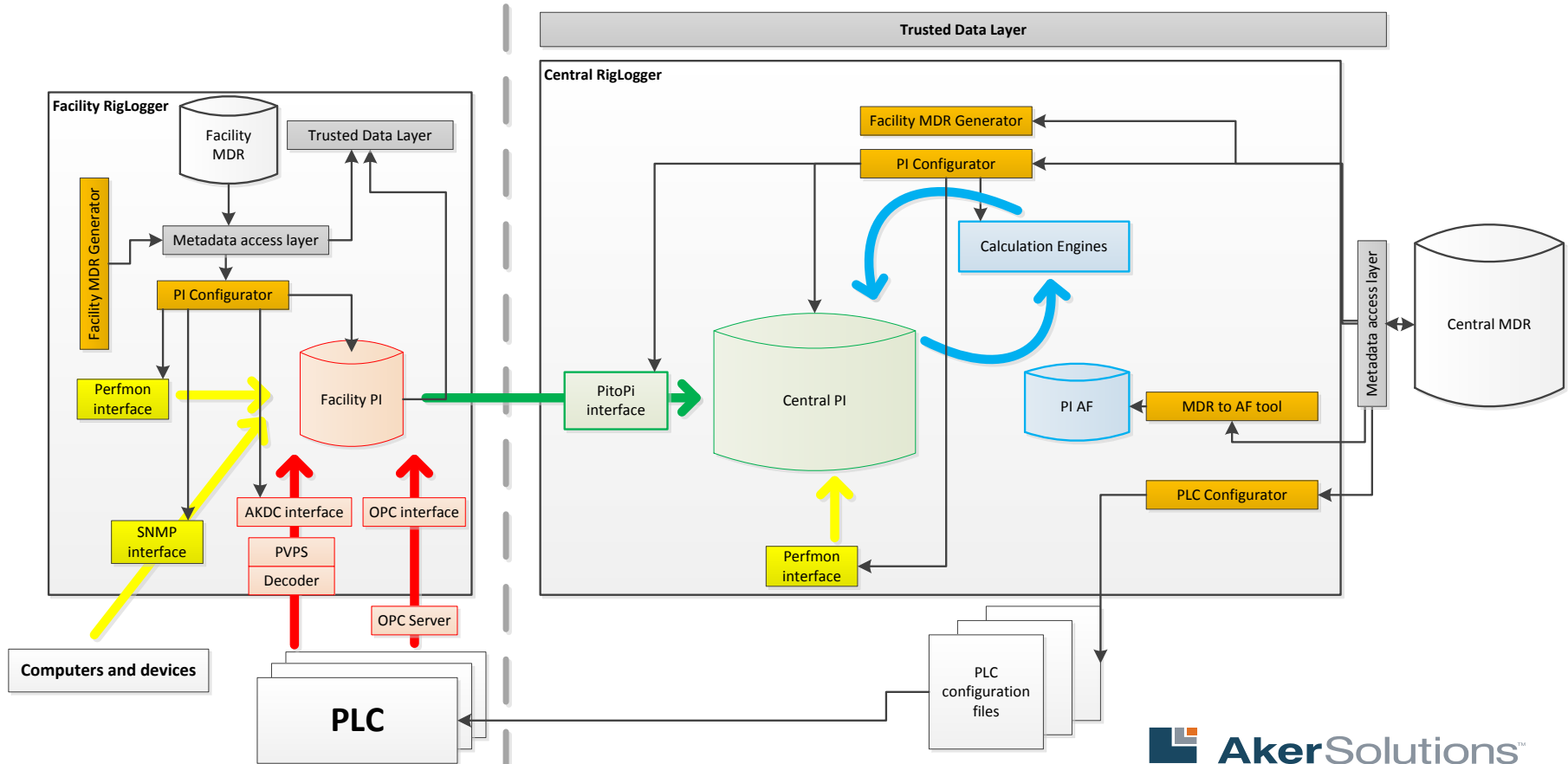
TDL

**Central Riglogger™**
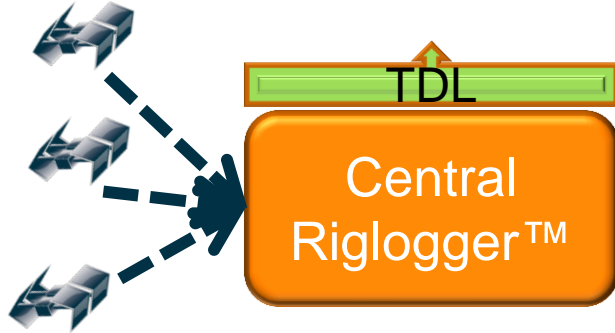
Facts:
- Receives data from all Facilities
- Runs on OSIsoft PI System and corresponding tools
- Security defined on Facility – can be controlled on individual tags/signals
- No users are given direct access to the PI System
- Near "Real-time" calculations performed
- Stores data for minimum 10 years
- Calculations centralized to avoid errors
- High focus on quality and reliability
- Forms the basis for:
    - Trouble shooting
    - Activity detection (CADS)
    - Ad-Hoc analysis performed by Aker equipment and operation experts
- Participate in ProaSens research project – 7th Framework programme in EU

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# Riglogger™ Analytics

TDL

**Central Riglogger™**

**Riglogger™ Analytics**
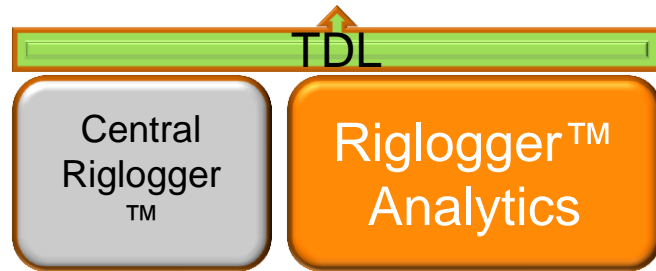
Facts:

- Performs off-line analytics
- Primarily based on Microsoft technology
- Security defined on Facility – can be controlled on individual tags/signals
- No users are given direct access to Analytics
- Stores data for minimum 10 years
- Calculations centralized to avoid errors
- High focus on quality and reliability
- Forms the basis for:
  - Trouble shooting
  - Operation detection (WITS)
  - Ad-Hoc analysis performed by Aker equipment and operation experts
  - Performance optimization
  - Condition Monitoring and CBM
  - Knowledge Transfer
- Participate in ProaSens research project – 7th Framework programme in EU

# Architecture for Riglogger™

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# myDrilling™

Welcome: **Tore Bjerke** Aker Solutions

**Aker**Solutions™

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**Current filter**
Your Rig ✕

**Overview**
Bulletins
Orders
Requests
Documentation

Home | Your Rig |

## Your Rig

Remote connection ⟳

**19** Average trip in per session

**25** Average trip out per session

**11** Orders in progress

**11** Bulletins unimplemented

**34** Requests open

Iceland, Finland, Sweden, Norway, United Kingdom, Poland, Germany, Ukraine, France, Italy, Spain — Google Map Data - Terms of Use

Wednesday 01 February -4°
Thursday 02 February -3°
Friday 03 February -10°
Saturday 04 February -10°
Sunday 05 February -8°

Owner: **Rig Owner**
Type: Semisubmersible
Sector: Europe — North Sea UK

Aker Solutions office: 🇬🇧 Great Britain

⚑ Report rig move

⚓ **Your Rig**

» Bop Handling Equipment
» Bulk Storage And Transport
» Compensator And Tensioners/Dat
» Control Rooms And Cabins
» Dcms
» Derrick Structure
» Drillfloor Equipment
» Drilling Risers
» High Pressure Manifolds And Well Controll
» Hoisting System Ramrig
» Misc
» Mud Circulation And Transfer
» Mud Mixing
» Mud Pumps
» Personnel Lifting
» Pipe Handling Equipment/Drillfloor
» Pipe Handling Equipment/Htv
» Pipe Handling Equipment/Vph
» Ramrig Hpu
» Ringline Hpu
» Riser Handling
» Solids Control
» Top Drives
» Utility Equipment
» X-Mas Handling Equipment

Downtime

Suggest request

Contact

Spare parts

Info

### 10 latest activities

| Type | What is new? | Time |
|---|---|---|
| ❓ Request | **Editing involved people** New comment: Passed to MyDrilling Team.. By: Robertson, George | 2 minutes ago |
| ❓ Request | **Edit Request** New comment: Passed to MyDrilling Team.. By: Robertson, George | 6 minutes ago |
| ❓ | B 732 TS HRN - Loss of HRN and | 7 minutes ago |

# myDrilling

## Real⬥Time
Data from Your Rig - powered by Riglogger™

**Aker**Solutions

Overview
Performance
Condition monitoring
Report
Recommendations

### ⬤ DDM

| Historic data | Load cycles | Alarms | Counters | Control systems |

| Load steps | Cycles | Partial damage |
|---|---|---|
| 900-1000 Tons | 10 | 0,1 |
| 750-900 Tons | 100 | 0,15 |
| 500-750 Tons | 2500 | 0,015 |
| 250-500 Tons | 4000 | 0,05 |
| 40-250 Tons | 15000 | 0,01 |
| 0-40 Tons | 10000 | 0,0001 |
| | | |
| **Total accumulated partial damage** | | **0,3251** |

**Partial damage**



Used load life — DDM accumulated load life

**Load distribution**



10, 100, 2500, 4000, 10000, 15000
- 900-1000 Tons
- 750-900 Tons
- 500-750 Tons
- 250-500 Tons
- 40-250 Tons
- 0-40 Tons
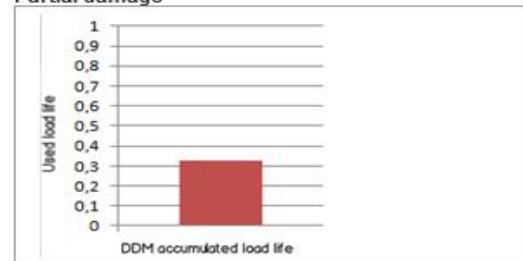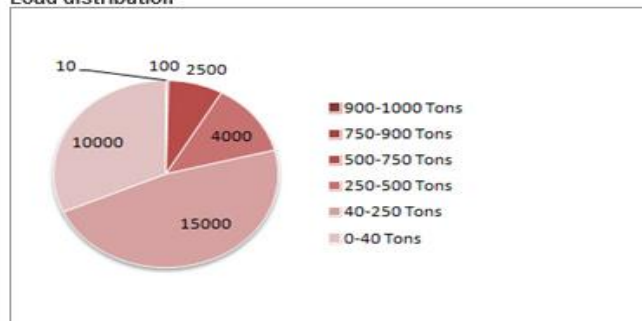
**Distribution partial damage**



40-250 Tons, 0-40 Tons, 250-500 Tons, 500-750 Tons, 900-1000 Tons, 750-900 Tons
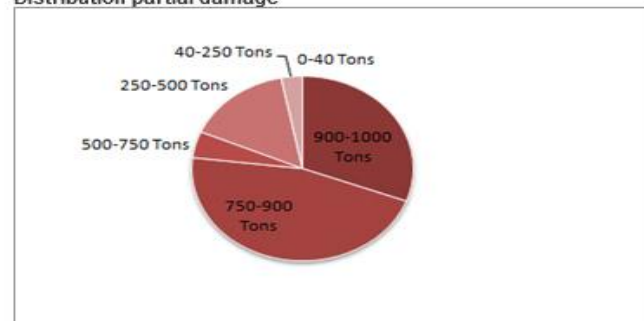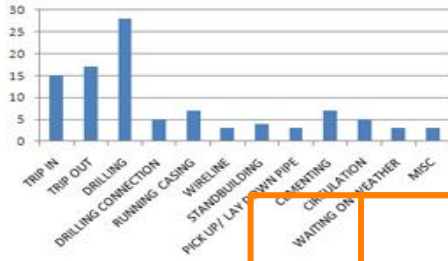
Trip sequence

Deviations highlighted
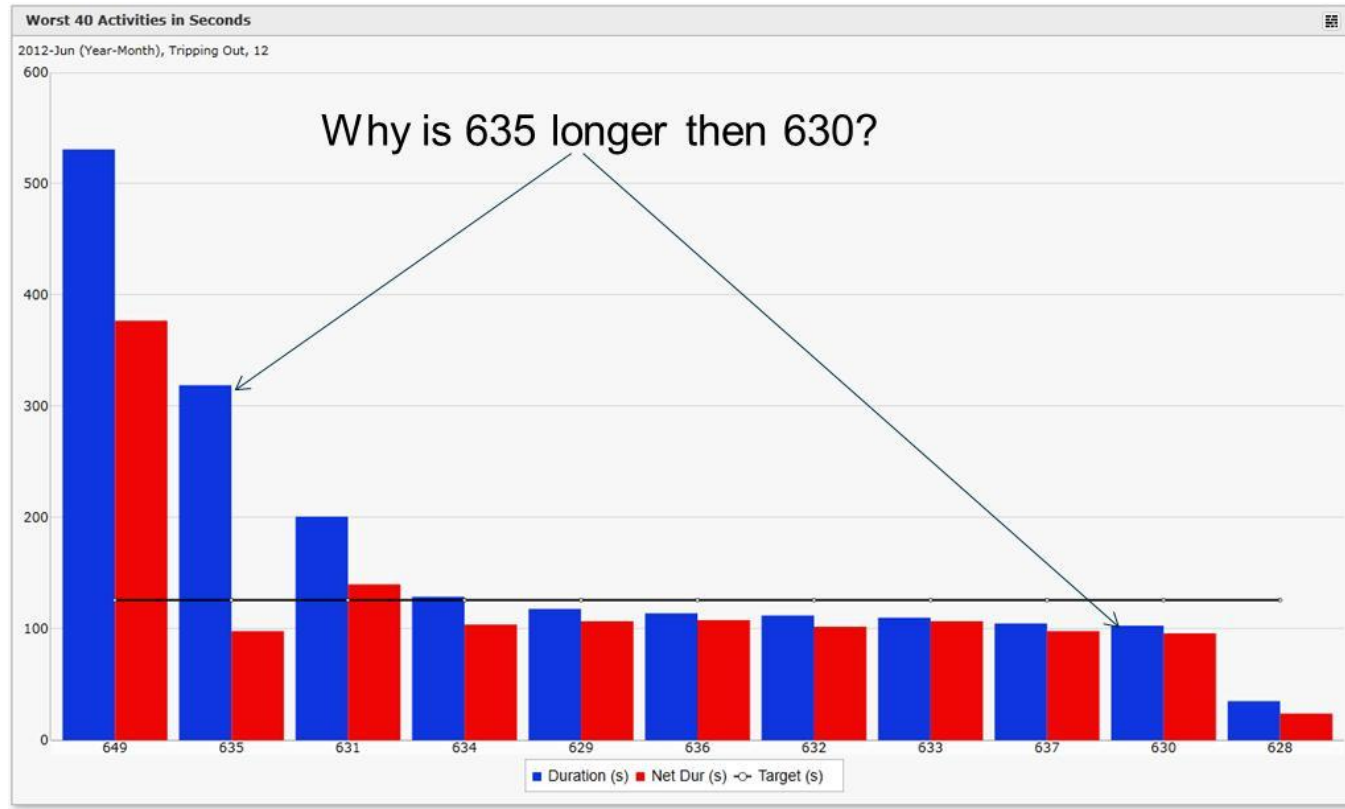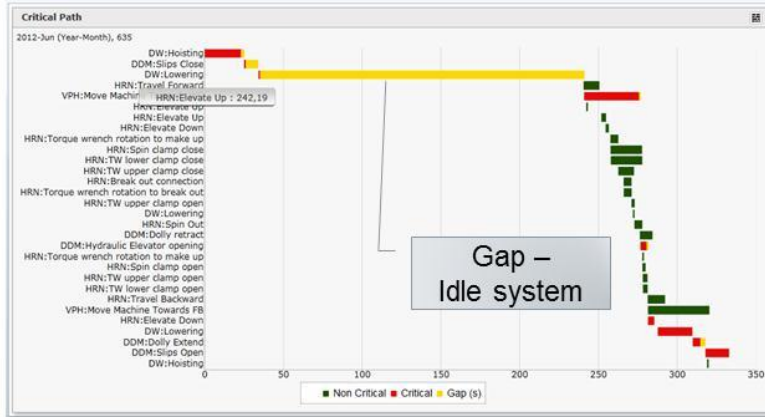Investigate details
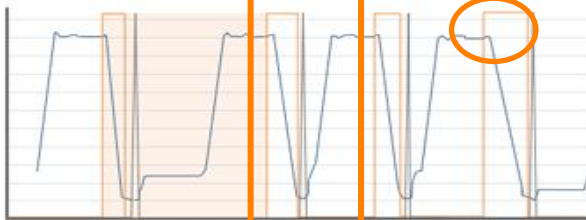
# Performance – Activity sequence
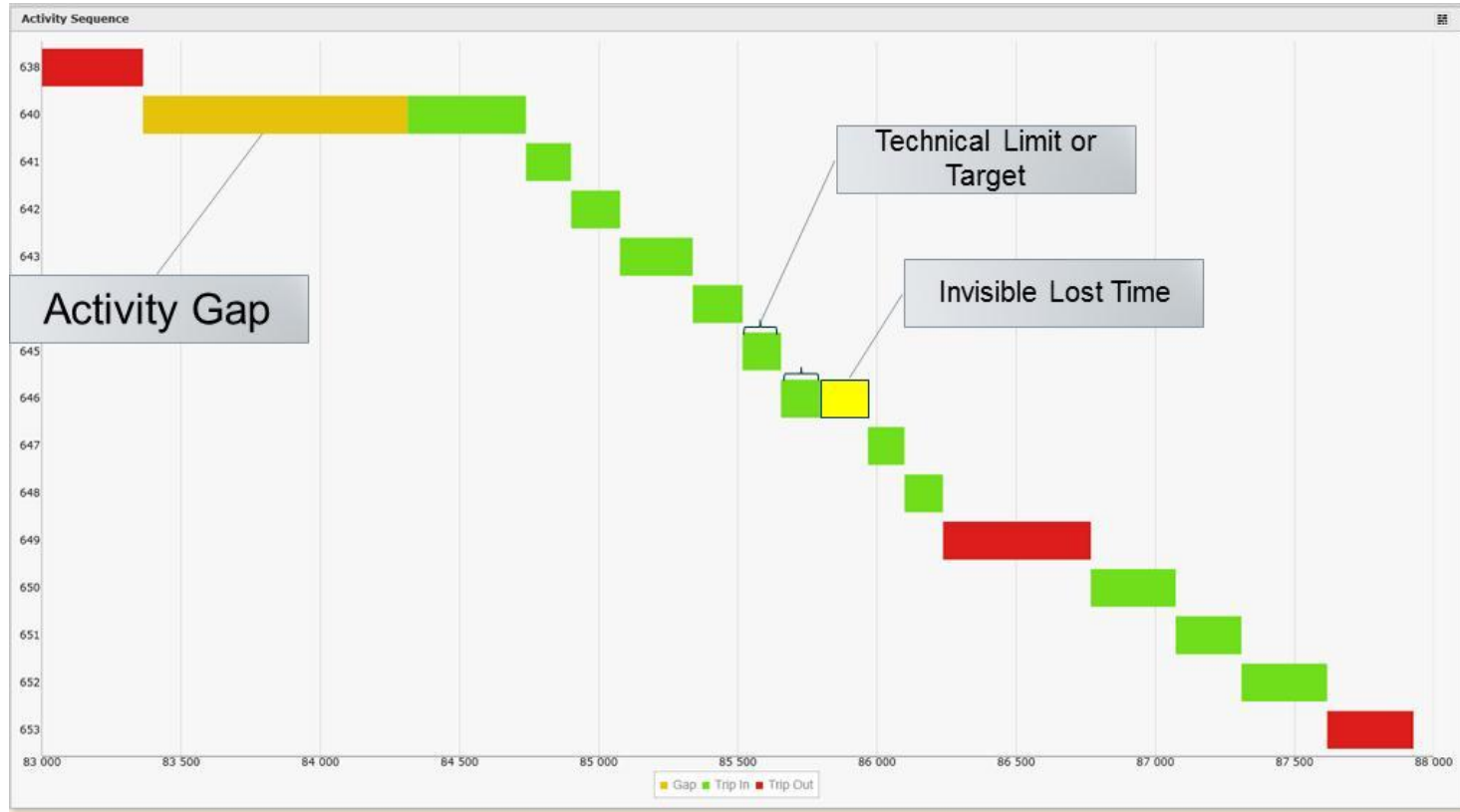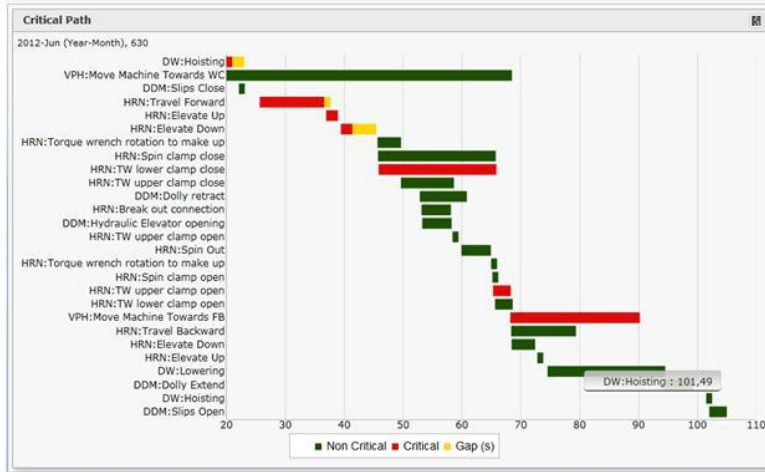
# Performance – 40 worst activities in seconds

# Performance – Why is 635 longer than 630?



**Conclusion:**

The system is idle for a period

# myDrilling™
### and Riglogger™

**The power of knowledge**

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**Aker**Solutions™

# Tore Bjerke

Tore.bjerke@akersolutions.com

Manager eConcept Technology Platform

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