



splunk>

# Benchmarking operational efficiency in subsea operations

## A journey in deep water using Splunk

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# About us



## RICARDO BICUDO

- M.Sc. Subsea Engineering
- 12+ years O&G industry
- Vessel Performance Manager

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## NELSON CARMELINHO

- B.S. Administration and Information Technology
- 20+ years Consulting services
- Head of ITC

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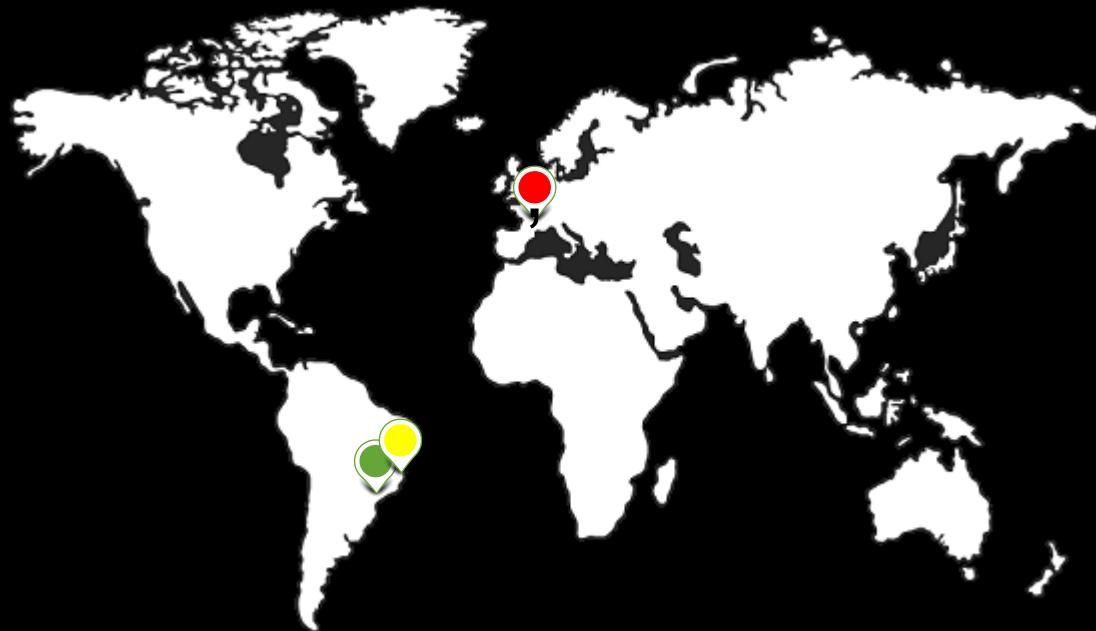
# WHO WE ARE



A Brazilian Shipping Company, a joint venture between two international key players in their markets, Seadrill and Sapura Energy.

Leading subsea services players in the Brazilian market, operating six pipelay support installation and another vessel designed for passengers and dry cargo

# Where we are



**Brazil**  
Rio de Janeiro

Corporate  
Operational center

Logistics yard  
Training center

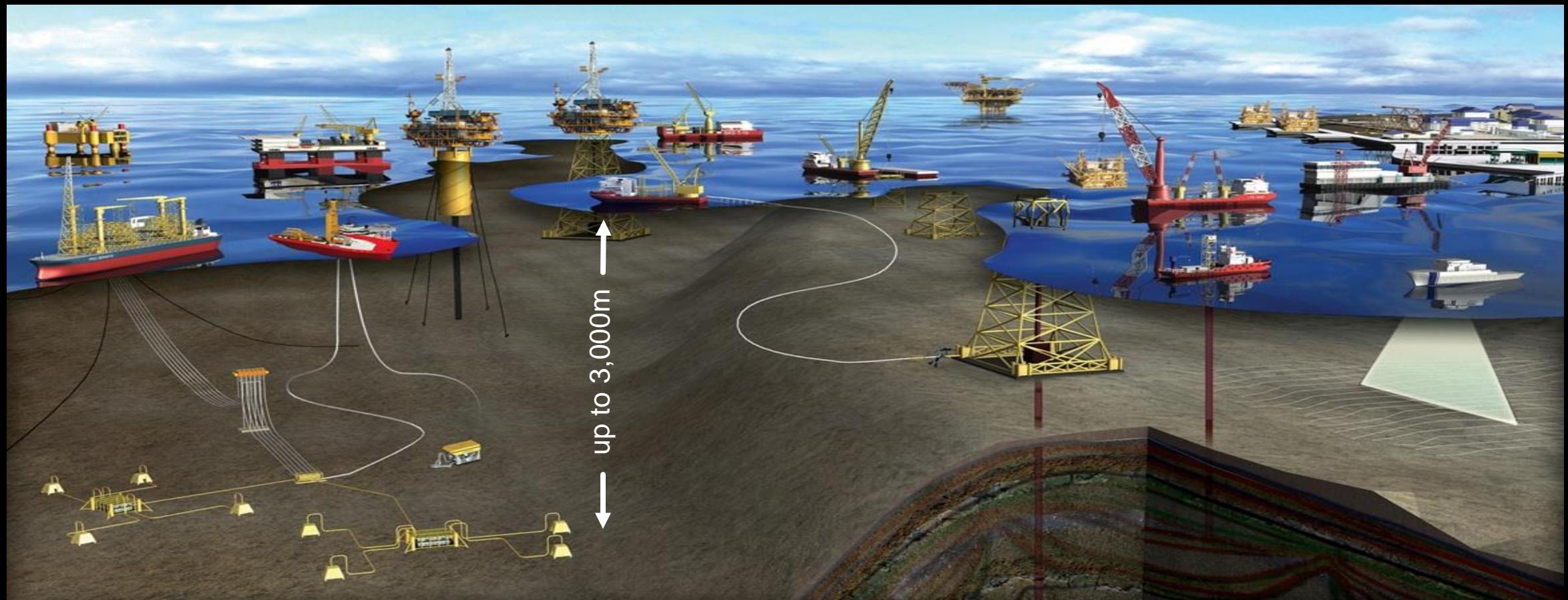
**Austria**  
Wien

Office



# What we do

## Offshore Construction and Subsea Services



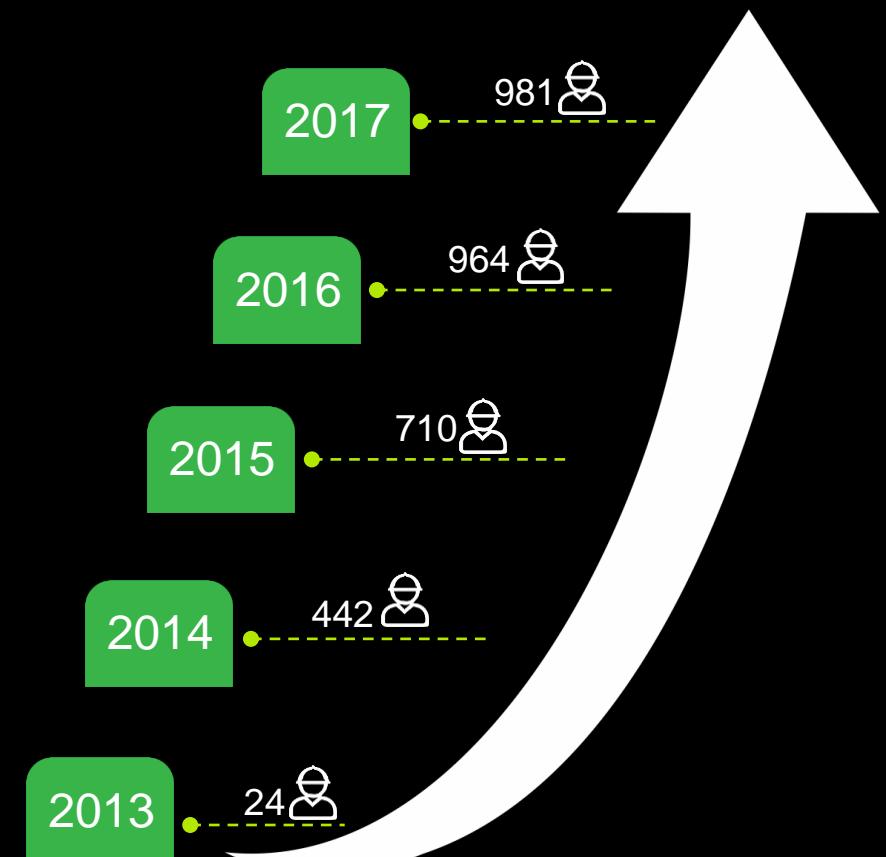
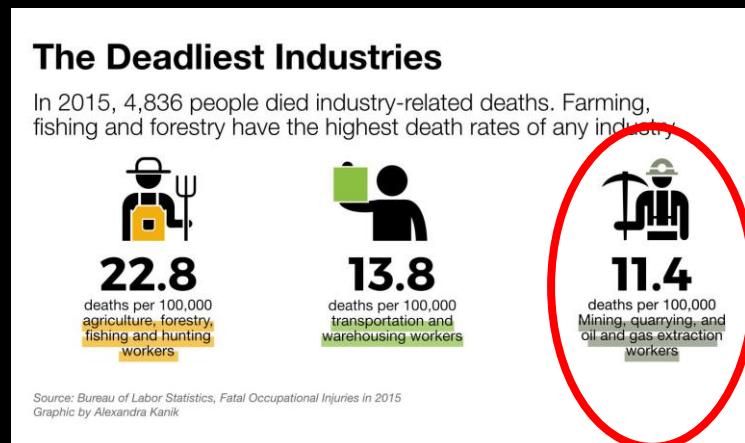
- Complex operations
- High specification equipment
- Challenging environment

# Our Challenge



# The path forward

- Challenging and transforming industry...



- Growing at speed...

- Driving value to the bottom line

- Employee development plans
  - Learning paths (70:20:10 model)
- Investment in training
  - Facilities
  - Simulation environments
    - Pipeline
    - ROV

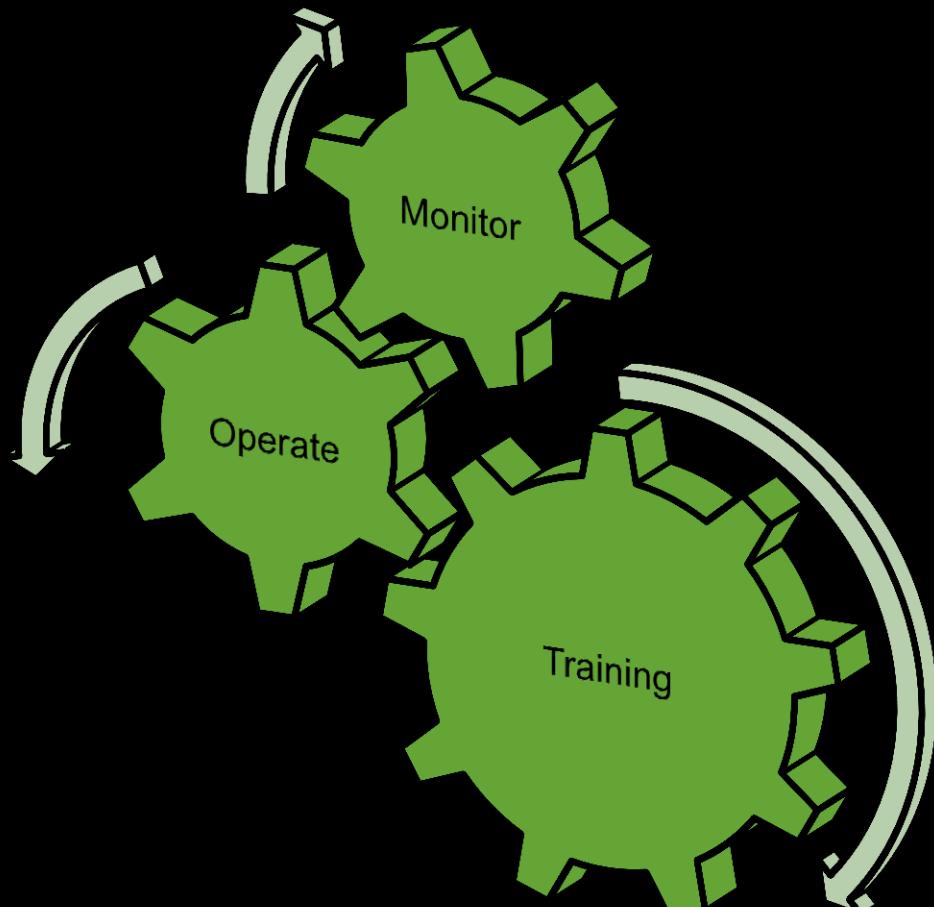


# Our first operational setup

# The main gears



Sapura  
intelligence

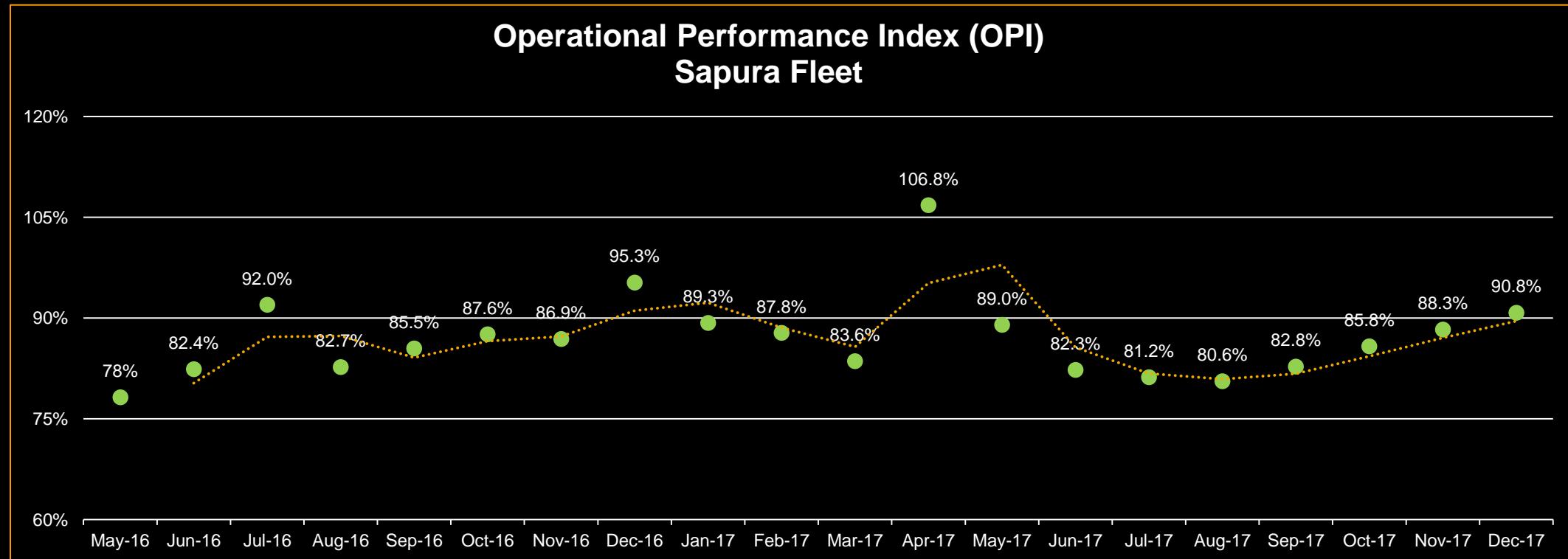


Focus on extract the best performance based on time-motion study



# Looking backwards

Gathering data to act upon key performance metrics

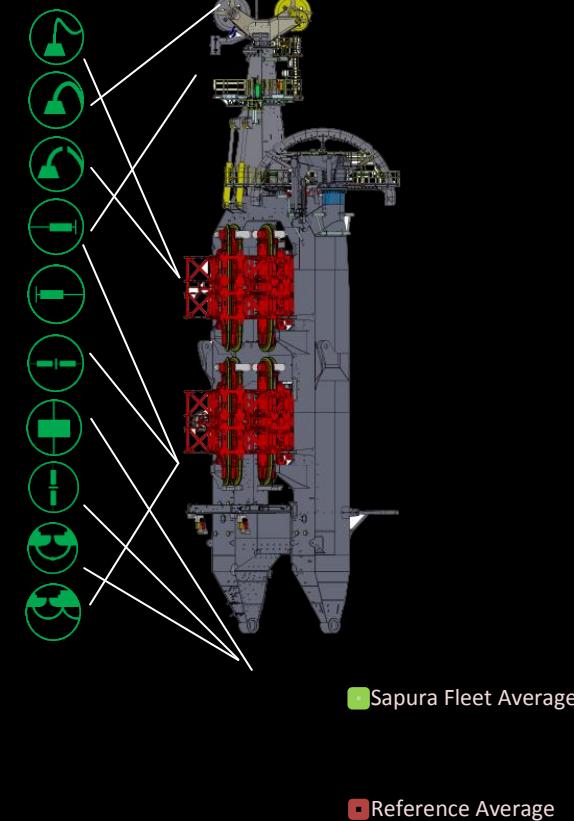


- Huge data to be analyzed
- Inconsistent daily logs report
- Wrong allocating hours
- Complex scope of work

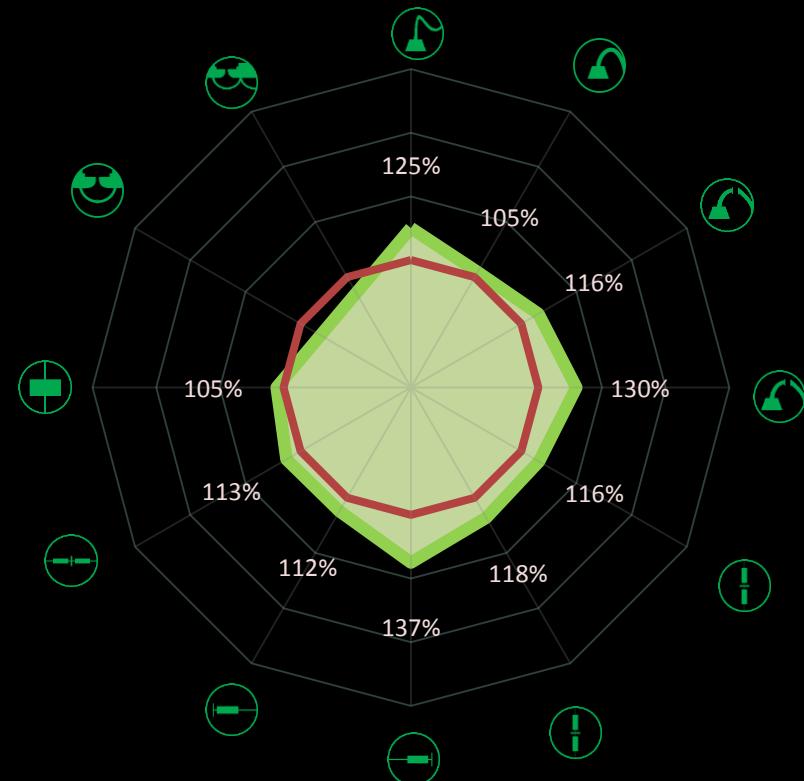
*Lack of visibility – No real time data*

# Looking backwards

## **Gathering data to act upon key performance metrics**



## **Operational Performance Index (OPI) Sapura Fleet (Aug/17 to Dec/17)**



- ▶ Striving to achieve reference values
    - Unconsistent convergence
  - ▶ Major deviations (+30%)
    - Leadership behavior
    - Employee engagement
  - ▶ Contractual exposure
    - Penalties – fines

“Asset Intelligence is a key factor for our company strengthening our safety and operational standards.”

Andre Merlino – CEO Sapura

# ReDesign our operations

## **Our new machine concept**

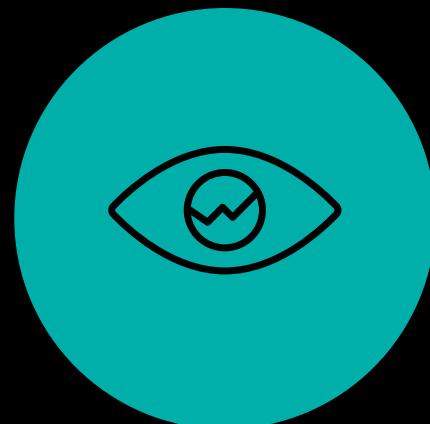
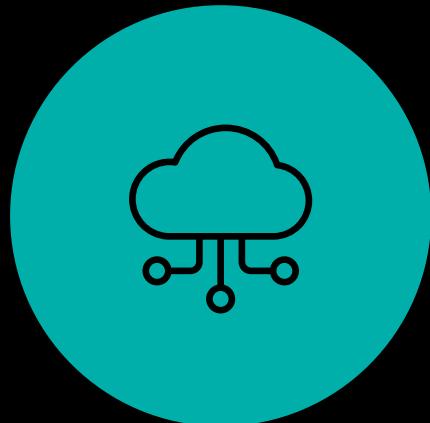


Aiming to a perfect alignment between time-motion and equipment status (condition based monitoring)

# Digital transformation journey



# Bear these four points in mind



- ▶ Data driven approach in subsea construction operations
  - ▶ Collect low layer data from vessel supervisory systems
  - ▶ Strengthen safety standards with real time monitoring and Splunk's analytics capabilities
  - ▶ Gain operational efficiency with Industrial Asset Intelligence



# Asset integration

Challenges collecting data

## Vessel

Vessel Management system



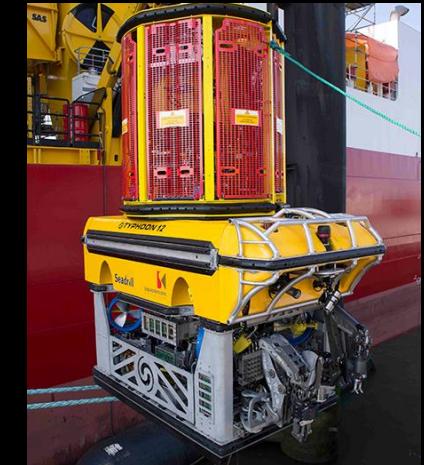
## Tower

Flexible Pipelay Spread



## Subsea

Remote Operated Vehicle



### Sub systems

- Vessel Management System
- Alarm monitoring System
- Diesel Generator sets
- Thrusters
- Main crane
- Auxiliary crane

### Sub systems

- Pipe lay tower
- Tensioner system
- Carousel

### Sub systems

- Tether management
- Surface system
- Subsea control
- Winches
- LARS (HPU/A-frame)

Total byte data/day

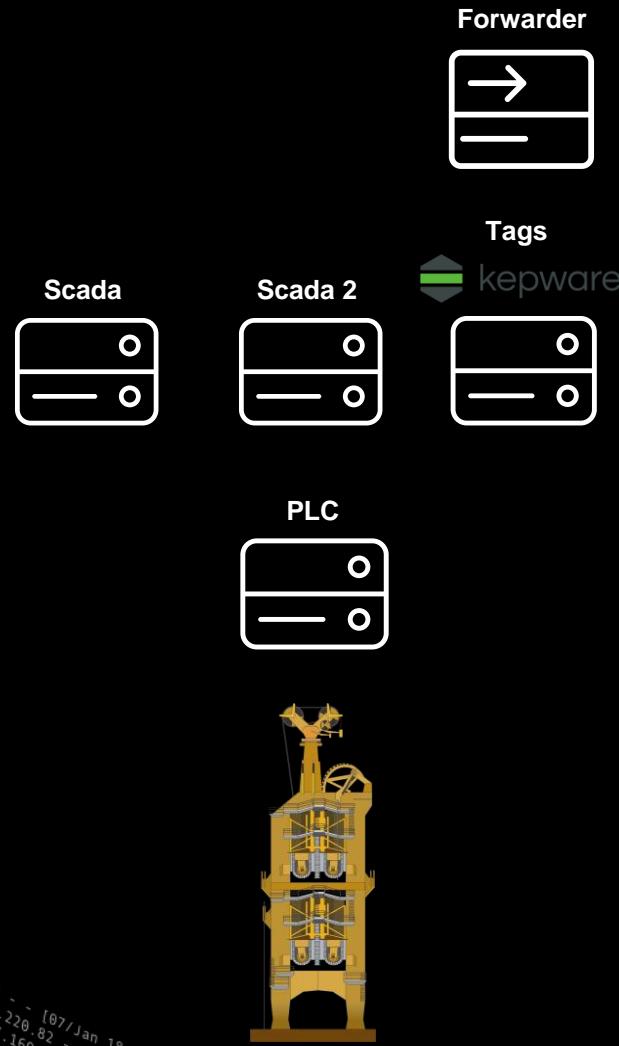
**68,581,440**

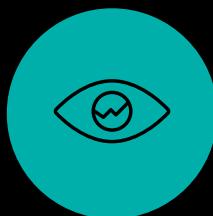
**21,859,200**

**7,471,797**



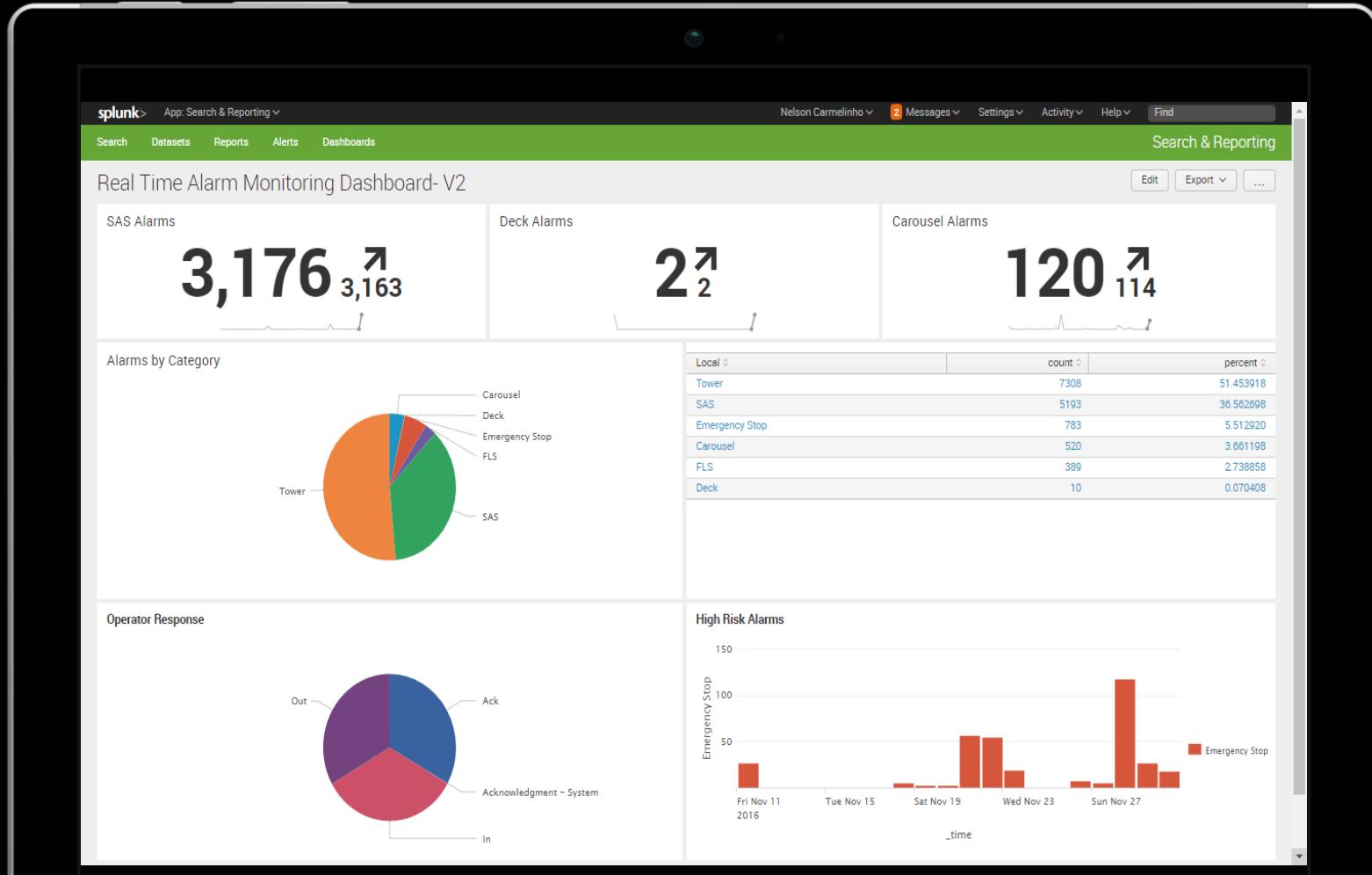
# Indexing data from offshore vessels





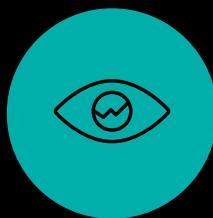
# Addressing real needs

A support tool for improve operational integrity



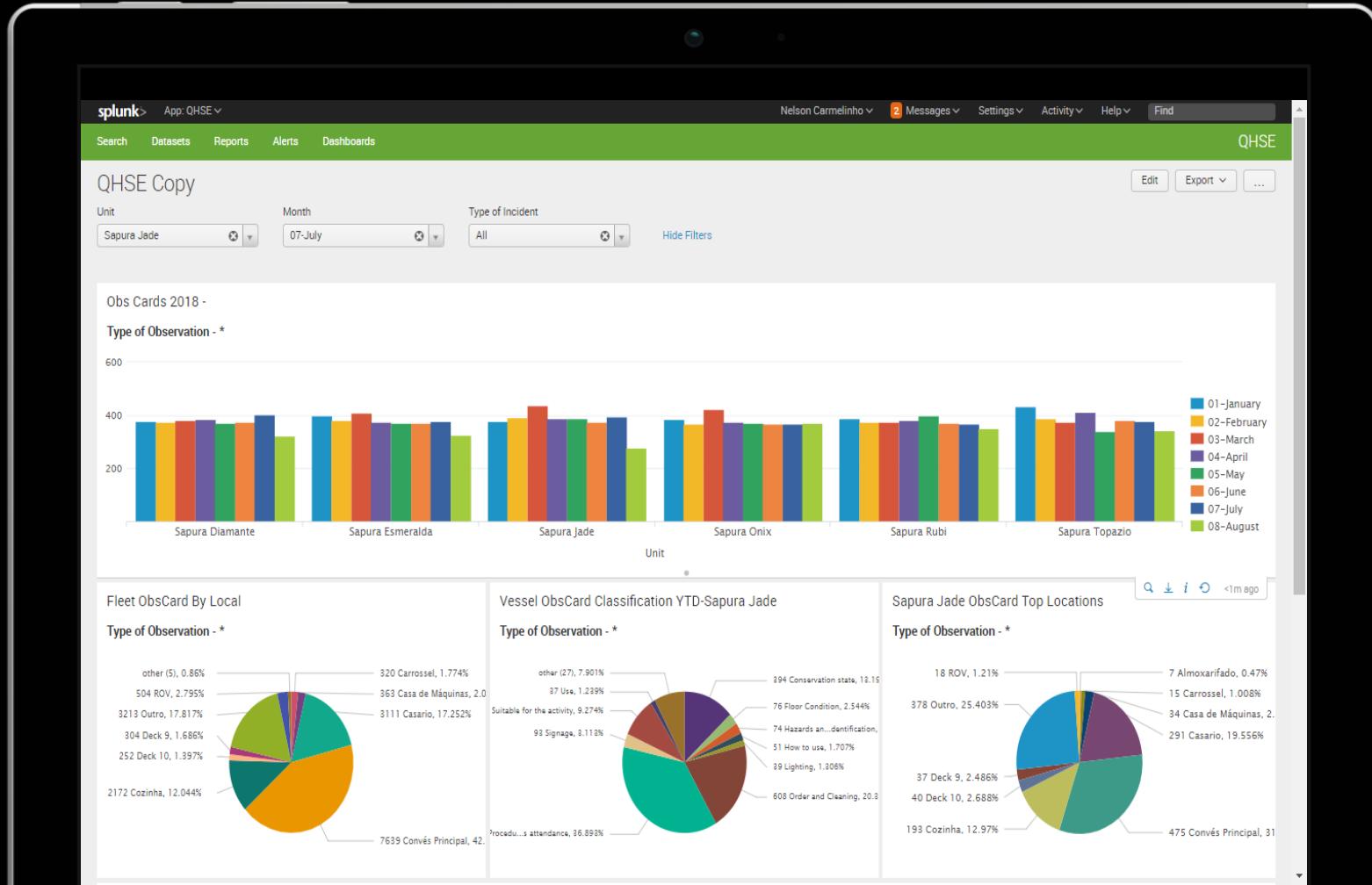
## Flexible Lay System

- ▶ Optimize coordination of complex operations
- ▶ Critical sequence alarms
- ▶ Improve operational human factor
- ▶ Benchmark



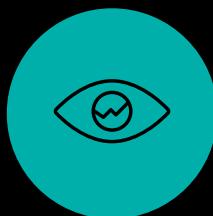
# Promoting a positive culture

## Unlocking the value of the data in a new way



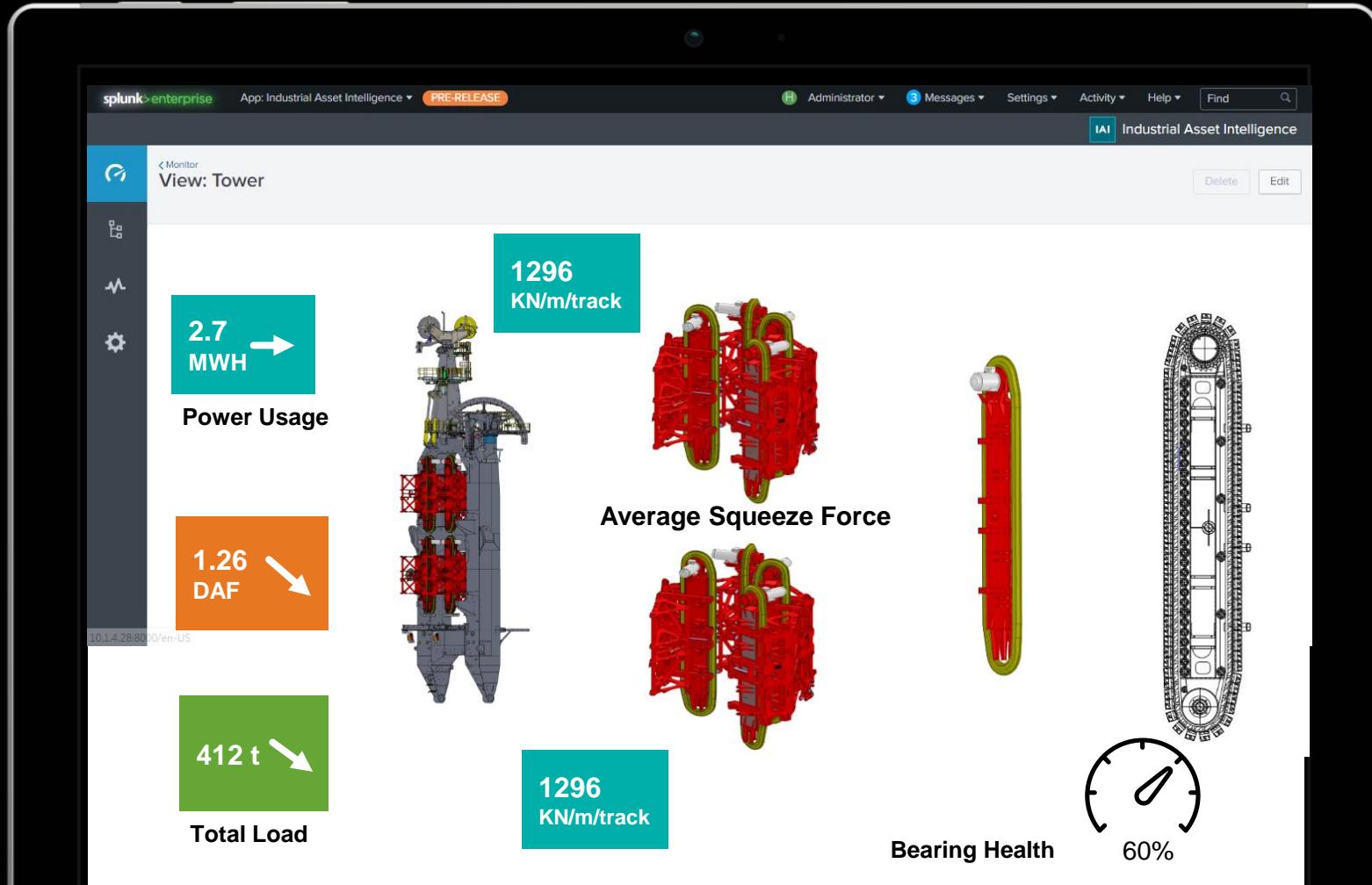
## QHSE leading indicators

- ▶ Online target analysis
- ▶ Quick feedback to observers
- ▶ Insights on ways to improve work environment
- ▶ Strengthen safety



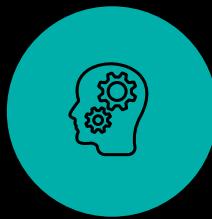
# Improving asset reliability

Essential monitoring to reduce risk of catastrophic events



## Flexible Lay System

- ▶ **Main tensioners**
  - Trackbody bearing monitoring
  - Critical to operation
  - Fatigue analysis
  - Variable:
    - load (0 - 550t)
    - speed (0 - 20m/min)



# Reshaped operations

A decision support concept



## Sapura Network Operations Center

Condition based monitoring

CCTV

Real time data

Real time monitoring

Analytics

Video analytics

Dashboards

Full Duplex comms

# What is next



# Digital transformation

## Asset Lifecycle Management

- › Monitor lifecycle efficiency
- › Dictates replacement
- › Monitor operational efficiency

## Operational efficiency

- › Strategic decision-making support
- › Target operating model

## Data acquisition

- › Real time sensors status
- › Several Supervisory Control And Data Acquisition

## Analytics

- › Optimization
- › Unlock asset potential
- › Machine learning algorithmic

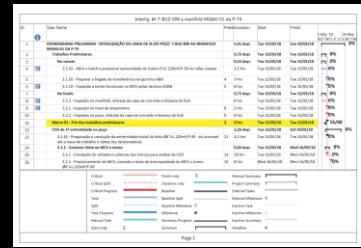
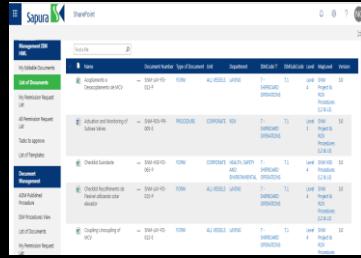
## Learning Management

- › Training model (70:20:10)
- › Support productivity-enhancing behavior



# The App project

## Online mobility for remote field operations



Procedures  
Instructions  
Tranning

Project

Camera  
Analytics

IOT  
Information



### ROV

Compensator level volume decreased  
Please check for leakage when return to Deck

### Tower

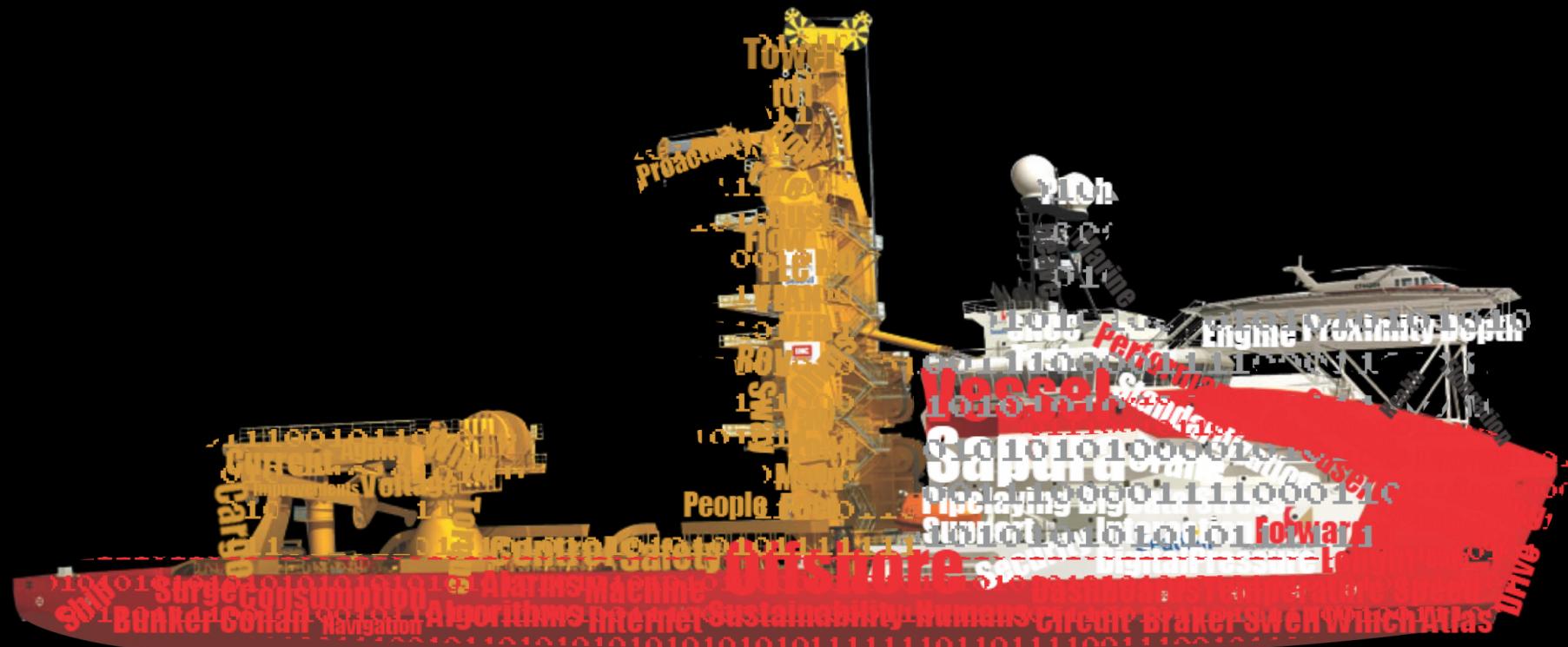
High Risk Alarms  
Acknowledge  
Average time to low

### Safety

Violation of rule – Exceed number of personnel at worktable

# The Digital Ship

## A full integrated asset



#Proud<sup>to be</sup>Safe    #Proud<sup>to be</sup>Sapura

# Q&A



# Thank You

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