What is CP (Cathodic Protection)?

- All offshore structures are exposed to degradation due to corrosion

- All structures are corrosion protected by painting or CP (Cathodic Protection) systems

- CP systems are designed during the detailed engineering phase, constructed and installed on the structure during the construction phase and installed during the installation phase

- All CP systems needs to be inspected and most likely to be replaced during the lifetime of the field

- Replacement of anodes is costly i.e. offshore operations

- Optimization of the CP systems, extension of the service life is a huge cost saving factor

- Up until now, no technology has been available for this kind of optimization
Measuring a car battery (V), does not estimate remaining life!

It won’t even tell you if it’s connected to the car...
FiGS® – a step change in subsea CP Inspection

Non-contact CP survey, buried structures
Can measure on buried and non-buried pipelines and structures

Rock dump & Concrete mattresses
No need for removal, no need for stops, continuous measurement

Marine growth on anodes, no cleaning
No need for cleaning and stabbing, which is time-consuming with potential of destroying anodes. Measures electrically disconnected anodes

Measurements of coating damages
Detailed measurement of coating defects on buried and non-buried pipelines and structures

Accurate data and sensitivity of the sensor
More data and new data acquisition, modelling and visualization

Vessel time efficiency
Non-contact and faster CP inspections of all structures, which reduces vessel time
From the PAST to the FUTURE

Exposed structures & pipelines

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Potential (mV)</th>
<th>Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 15</td>
<td>- 1000</td>
<td>ABC-123</td>
<td>Steel Contact</td>
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<tr>
<td>- 30</td>
<td>- 980</td>
<td>ABC-246</td>
<td>Steel Contact</td>
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</tbody>
</table>

Buried structures & pipelines

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Potential (mV)</th>
<th>Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>ABC-468</td>
<td>Contact measurement not possible</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>ABC-321</td>
<td>Contact measurement not possible</td>
</tr>
</tbody>
</table>

Spot checks
Only a snapshot of the status
Lack of knowledge regarding redundancy of the system

Critical areas
- non protected/ protected
- coating damages

Accurate & detailed data
- current flow inside and around structures
- is the structure protected
- or is it protecting other structures/pipelines

Future predictions
- remaining life
- time to next inspection
- effect of modifications
- ~100% CP status
Predictions with SeaCorr™

Today

Tomorrow
(5-10-20 years)
CP survey application areas

- Offshore wind & power cables
- FPSO / Hulls / Mooring lines
- Jackets / Semi sub & Jack-ups
- Flexibles
- Gravity based structures
- Pipelines (buried / exposed)
- In-field structures
FiGS® timeline – from the past to the future

2007-2013
FiGS® developed with partners:

2015
Statoil approval TRL7 and Shell Global - approved for multi use

2014 -2016
Performed 13 CP surveys

2017
> 250 offshore days with FiGS
3D Plots

SeaCorr™
Market size pipelines only

- Total pipeline market estimated to be approximately 3 million kilometres

- 1.5 million kilometre of todays pipelines are “non piggable”, according to Pipeline & Gas Journal.

- 50% of all subsea pipelines are “non piggable”

- Global market with global pricing
Go to Market 2 way strategy

- We will drive our own Go to Market on a Geographic expansion as depicted to the right
  - Direct exposure
    » Trade shows
    » Active support to partners
- We will push expansion through our Key Accounts which might deviate from the geographic expansion

Time

Norway
UK
Aus
S.e. Asia
Can
US
Brazil
Middle E.
Africa
Markets for FIGS

- The FIGS is well suited for 4 segments within the O&G maintenance
  - Pipeline/Risers
  - Jackets
  - In-field structures
  - FPSO/Hulls/anchors

- At a later stage we see the same potential for service sale in adjacent offshore markets
Different vehicles used subsea

- **ROV**
  - ROV stands for Remotely Operated Vehicle.
  - ROV's are highly maneuverable underwater robots operated by someone at the water surface.

- **AIV**
  - AIV stands for Autonomous Inspection Vehicle.
  - An AIV operates independently from the ship and has no connecting / umbilical cables. An AIV can stand still under operation.

- **AUV**
  - AUV stands for Autonomous Underwater Vehicle.
  - An AUV operates independently from the ship and has normally no connecting / umbilical cables. An AUV cannot stand still under operation.

Typical survey speed:
- ROV: 0.5 km/h
- AIV: 5-10 km/h
- AUV: 5-10 km/h
Materials Performance – Corrosion Award