It’s a busy place!

BP’s INSPECTION RENAISSANCE

“100% of underwater inspections will be performed by remotely operated systems by 2025”

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Clearly messaging BP expectations:

“100% of subsea inspection will be conducted by MAS from 2025....."
WHY?

1. Address the **Target Zero** carbon reduction agenda
2. **Reduce Risk** to Personnel – Key operators working from shore
3. Perform inspections **Faster** Fast Digital Imaging (FDI) Inspections / FROV
4. Perform inspections at **Lower Cost** Marine Autonomous Surface Ships (MASS)
5. **Higher quality** digital data moving toward automated processing
6. **DATA is KING** Gather ONLY what you need Automated editing, event and anomaly detection

FDII + (UUV/AUV) + USV = Success!
FDI inspections performed on Four occasions for BP:

1. 2017 North Sea (478km 94.72hrs Ave 5.05kmh) DeepOcean, FAST ROV
2. 2018 North Sea (301km 114.49hrs Ave 2.63kmh) i-Tech7 – Reconfigured WROV
3. 2018 T&T (432km 193.72hrs 2.23kmh) REACH MMT – Reconfigured WROV
4. 2019 North Sea (290km 82.4hrs Ave 3.52kmh) i-Tech7 – Reconfigured WROV

In execution:
Caspian 798 kms (Acoustic / XOCEAN)

Planned:
Caspian – 140 kms in 2020 (FDI)
North Sea 300kms (FDI)

Key objectives:
• Standardisation
• Normalisation

Set the new industry ‘Norm’ for inspection
Using some VERY rule of thumb math!

- 1 Litre of Diesel (832g) releases 2.68kg CO2
- 1kg CO2 = 559 litres at 1 atmosphere, 27 degrees
- *Or 1 litre diesel releases approximately 1.5 cubic metres CO2*
- 4 campaigns (employing average 12 cubes diesel / day) resulted in **56 days saving in time**, resulting in both fuel and hence carbon emission reduction

- Employing above:
  - 56 days at 12 cubes / day = 683 cubes diesel saved
  - 1 cube diesel delivers 1500 cubic metres CO2
  - **SAVING of 1.02 million cubic metres CO2**
  - **OR 1800 tonnes CO2!**
CHALLENGES (JUST A FEW)

- Over the Horizon Operations
- Base facility & manning requirements
- Vessel endurance, depth and weather capabilities
- Maintenance & Reliability (vessel & vehicle)
- Launch & Recovery / tether management
- Underwater vehicle communications & control
- Bandwidth and latency
- Automation vs autonomy
- Emergency recovery / failsafe / contingency planning
- Regulatory requirements (COLREGS/MASWRG/local reg.)
1. **Lower carbon footprint and enhanced HSE performance** through application of these systems.

2. BP is modernising and transformation our business to **make inspection more efficient**.

3. FDI is a renaissance technology. **FDI is data focussed** with even greater efficiencies to be realised through the implementation of unmanned – tethered / untethered underwater systems operated from shore.

4. BP will partner with two contractors to develop USV combination systems for market **to meet the stated BP objectives**

5. BP will **review and implement advanced and alternative inspection technologies** in all areas to further increase inspection efficiency.
QUESTIONS?

Will market forces dictate (Oil Price)?

Will BP commit to this path?

Non Contact CP?

Machine Learning and Artificial Intelligence?

Will there be a new standard?

FDI Inspection?

Is the final data acceptable?

Unmanned Systems?

Remote Operations Centres?
• FDI Inspection is a TECHNIQUE, not an Inspection category
• FDI replaced Video with Stills Imagery and contact CP with Field Gradient CP.
• Data is acquired in a single pass, processed and reviewed ‘after the acquisition cycle’
• FDI is ideally suited for Fast ROV or AUV Operations
• FDI may be configured for GVI or FGVI by adjusting sensor configuration and geometry