



# Seabed Survey for Pre-Decommissioning of Offshore Wind Park (OWP)

*February 2021*



# Company Introduction



## **Horizon GmbH**

CEO: Capt. M.R. ILIATI

Operating in Europe

Essen, Germany

[www.horizongmbh.net](http://www.horizongmbh.net)



## **Deep Sea Offshore Int.**

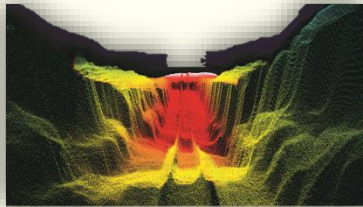
CEO: Capt. M.R. ILIATI

Operating in Middle East

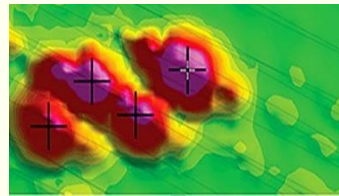
Dubai, UAE

[www.deepseaoffshore.net](http://www.deepseaoffshore.net)

# Service Capabilities



Geophysical Seabed Services



UXO Survey Services



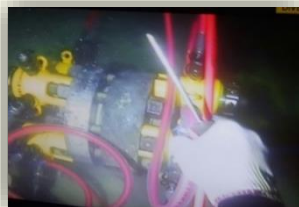
Engineering Services



ROV Services



PHOTOGRAMMETRY & REMOTE SENSING



Diving Services



Geotechnical Services



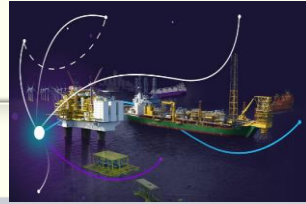
Positioning Services

# Track Records

## (2011-2020)

Categories	No. of Jobs
Geophysical Site Survey	58
Geophysical Route Survey	24
Geotechnical Investigation	9
ROV Services	53
Positioning Services	22
Diving Services	23
Engineering	14
Cable Activities	3
Construction Jobs	11
Rig Movement	3
Ship Management and Logistics	10

# Application of Seabed Survey in Oil/ Gas Industries



Explore

Appraise

Develop

Produce

Decommission

- ☐ Seismic Survey

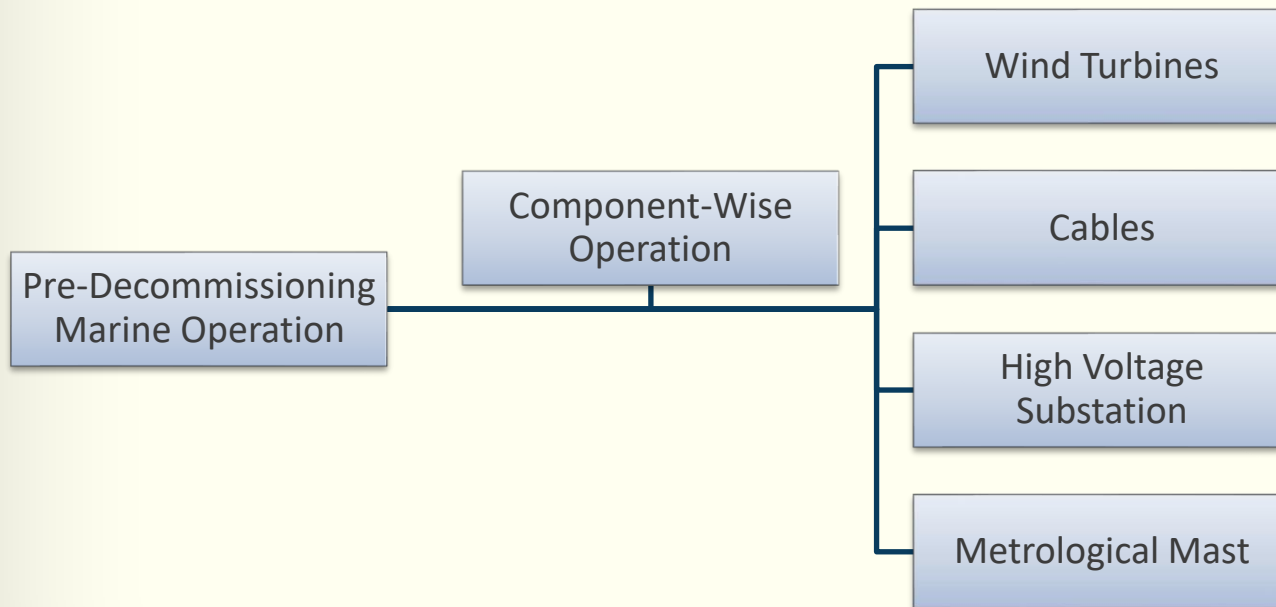
- ☐ Geophysical Survey
- ☐ Seismic Survey
- ☐ Geotechnical Survey
- ☐ Rig Positioning

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- ☐ Geotechnical Survey
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- ☐ As Built Survey

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- ☐ Asset/Structures Inspection

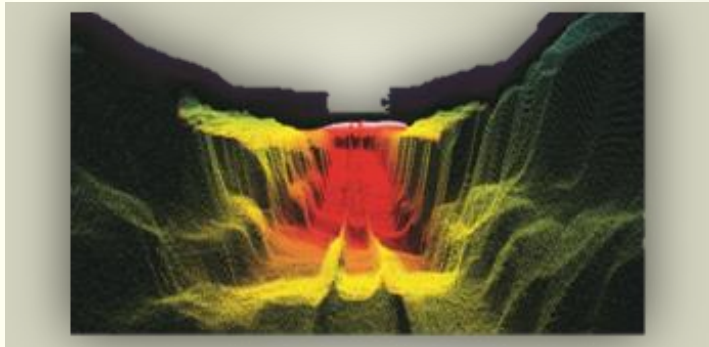
- ☐ Geophysical Survey
- ☐ As Left Survey
- ☐ Construction
- ☐ Asset/Structures Inspection

# Application of Seabed Survey in Pre- Decommissioning of OWP Components





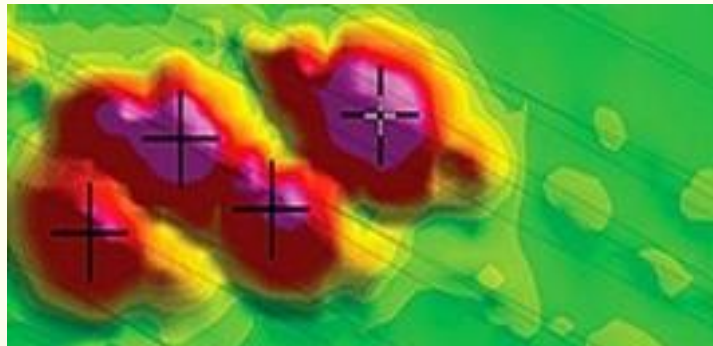
# Seabed Survey Categories for Pre-Decommissioning of OWP Components



**Geophysical Site/Route Survey**



**Visual Inspection and Debris Removal**



**UXO Survey**



**Geotechnical Services**

# Objectives of Seabed Survey for Pre- Decommissioning of OWP Components

- 1) **Identification** and **Removal** of Debris
- 2) **Identification** and **Report** of Possible UXO
- 3) **Identification** of Possible Crossing of Assets/Object and Target Cable
- 4) **Identification** of Cable Burial Depth
- 5) **Identification** the Status of Existing Protection around Monopile
- 6) **Identification** and **Report** of Special Marine Habitant and Marine Archeology around Structures
- 7) **Identification** of In-services/Abandoned Assets Along Target Cable Route
- 8) **Identification** of Seabed Topography around the Structures & Cable Route



# Multi Purpose DP Survey Vessel

## Mobilized For:

- ❖ Geophysical Survey
- ❖ UXO Survey
- ❖ ROV Visual Survey & Debris Removal



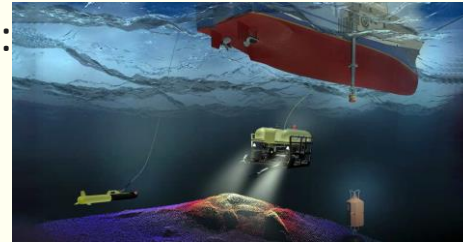
# Geophysical Site/Route Survey

## Data Acquisition, Equipment



### ☐ Surface Positioning:

- ❖ DGPS
- ❖ Gyro Compass



### ☐ U/W Positioning:

- ❖ USBL/SSBL
- ❖ Beacons



### ☐ Bathymetry:

- ❖ MBES/SBES
- ❖ MRU
- ❖ SVP



### ☐ Magnetic:

- ❖ Magnetometer



### ☐ Seabed Morphology:

- ❖ Side Scan Sonar



### ☐ Seismic:

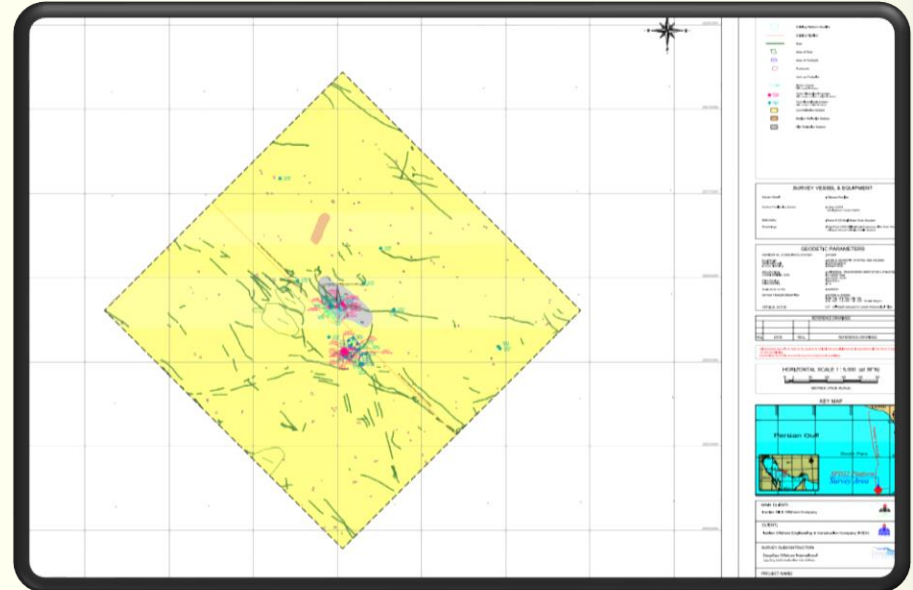
- ❖ SBP

# Geophysical Site Survey

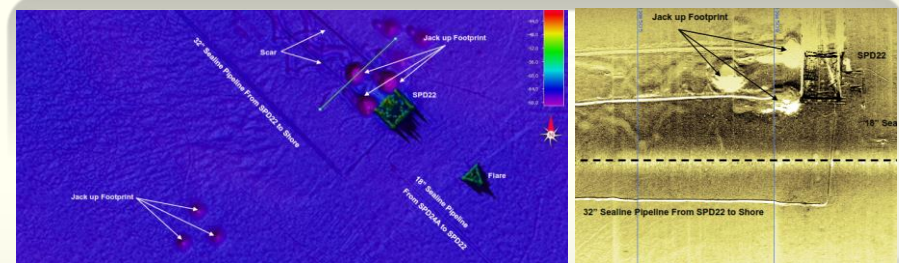
## Final Reports and Delivery

### ❖ Site Survey around Wind Turbines, High Voltage Substation and Metrological Mast

- ❑ Operation Summary
- ❑ Vessel/Equipment/Personnel
- ❑ Survey Methodology
- ❑ Survey Results:
  - ✓ Status of Seabed Topography & Protection around Structures
  - ✓ Details of Found Objects/Debris/Structures
  - ✓ Condition of Sub-Layers
  - ✓ Details of Detected Magnetic Anomalies
  - ✓ Survey Charts



Site Survey Charts



MBES Data

SSS Data

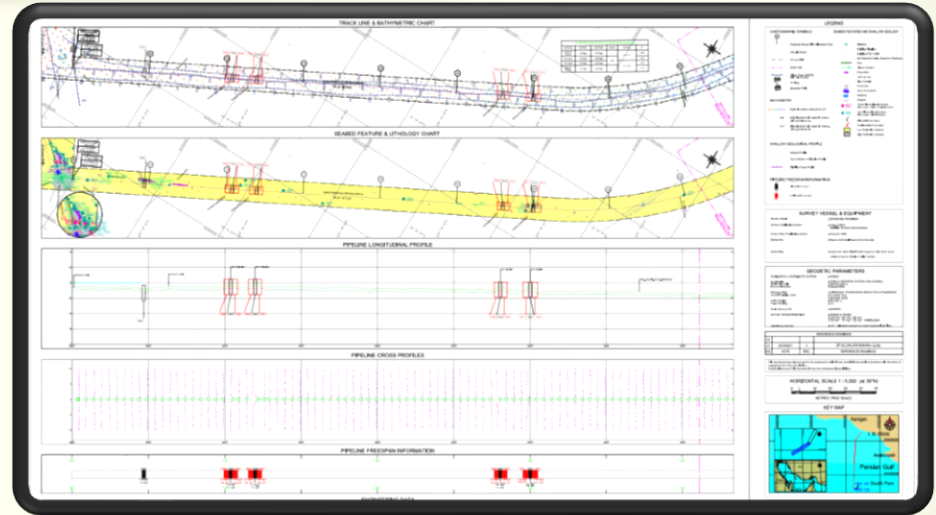


# Geophysical Route Survey

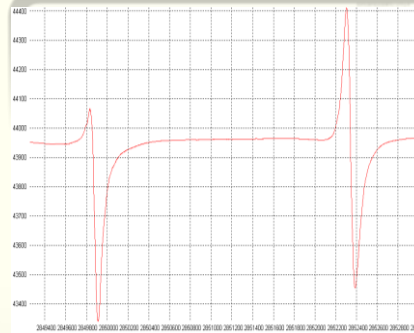
## Final Reports and Delivery

### ❖ Route Survey Along the Cable Route:

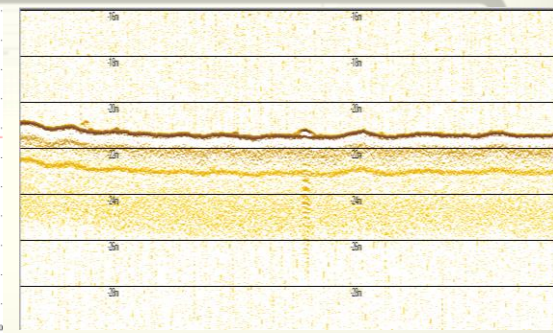
- ☐ Operation Summary
- ☐ Vessel/Equipment/Personnel
- ☐ Survey Methodology
- ☐ Survey Results:
  - ✓ Seabed Topography
  - ✓ Details of Found Objects/Debris/Structures
  - ✓ Condition of Sub-Layers
  - ✓ Details of Detected Magnetic Anomalies
  - ✓ Burial Depth of Cable
  - ✓ Details of Crossing
  - ✓ Alignment Sheet Charts



Alignment Sheet Chart



Maggy Data



SBP Data

# UXO Survey

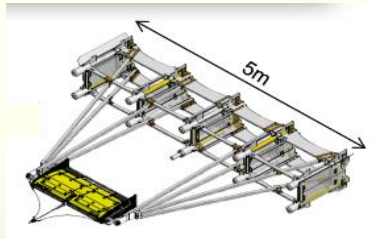
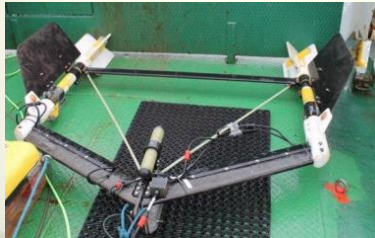
## Plan & Methodology

### ❖ UXO Survey Planning:

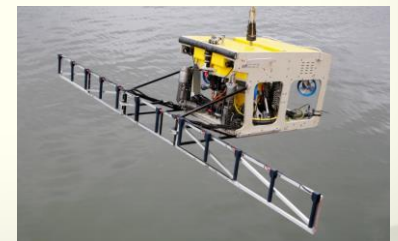
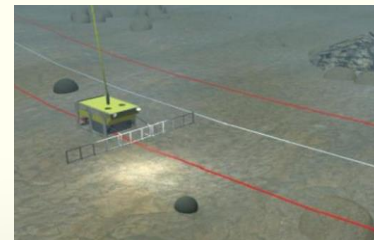
- ✓ Type of UXO
- ✓ Local Marine Environment
- ✓ UXO Risk Strategy

### ❖ UXO Survey Methods:

#### Towed Gradiometer



#### ROV Mounted Gradiometer

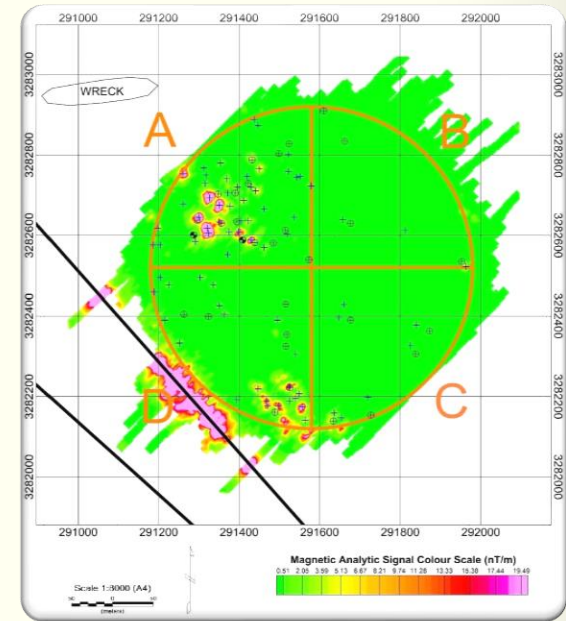
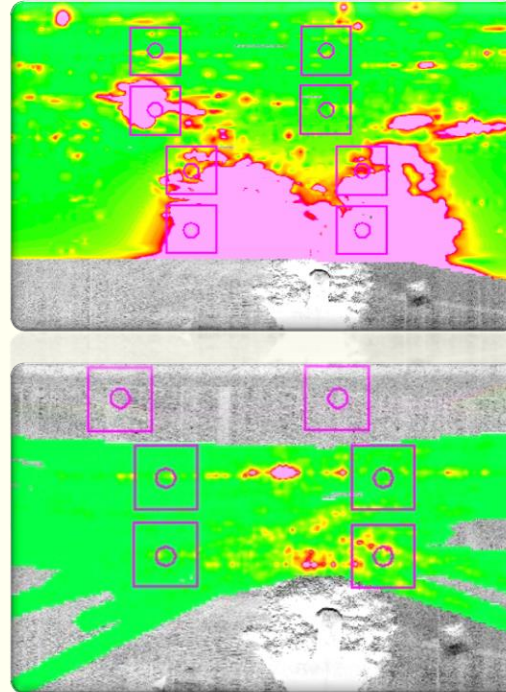




# UXO Survey

## Final Reports and Delivery

- ☐ Operation Summary
- ☐ Vessel/Equipment/Personnel
- ☐ Survey Methodology
- ☐ Survey Results:
  - ✓ Details of Found Possible UXO
  - ✓ Risk Analysis
  - ✓ Suspected Area



# Visual Survey and Debris Removal

## Objectives



Visual Survey on  
Reported Possible  
Debris/UXO



Visual Survey around  
the Structures



Debris Removal

# Visual Survey and Debris Removal

## ROV Assets

### Swift XL09

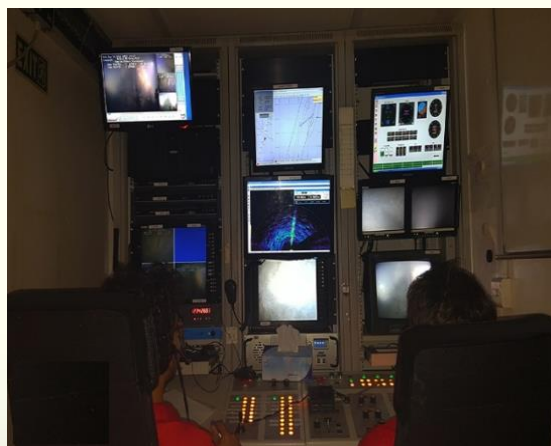
- ❖ 125 HP Work Class ROV
- ❖ 2000 m Rated

### Explorer3

- ❖ 100 HP Work Class ROV
- ❖ 1000 m Rated

### ROV Benefits Vs. Diver:

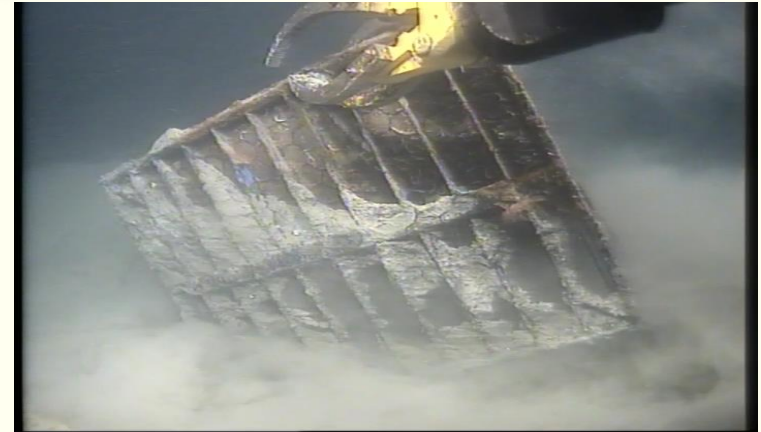
- Quick Deployment
- Extended Dive Times
- Video Recording Capabilities
- Fit into Confined Areas
- Safety Improvement
- Cost-Effective
- Minimal Maintenance





# ROV Debris Removal Operation

## Sample Photos of Similar Jobs



# ROV Debris Removal Operation

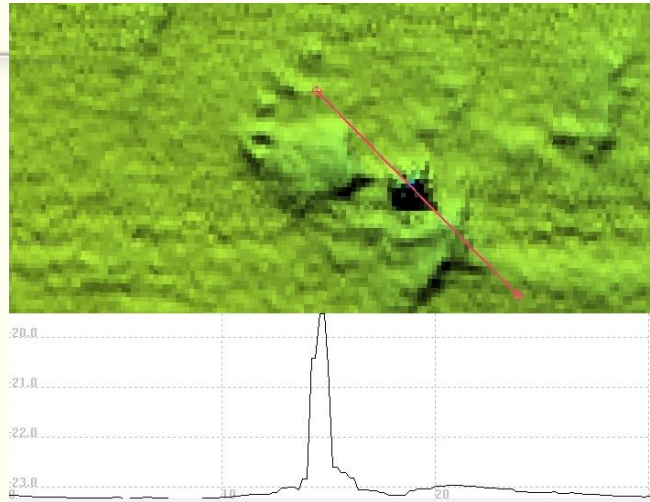
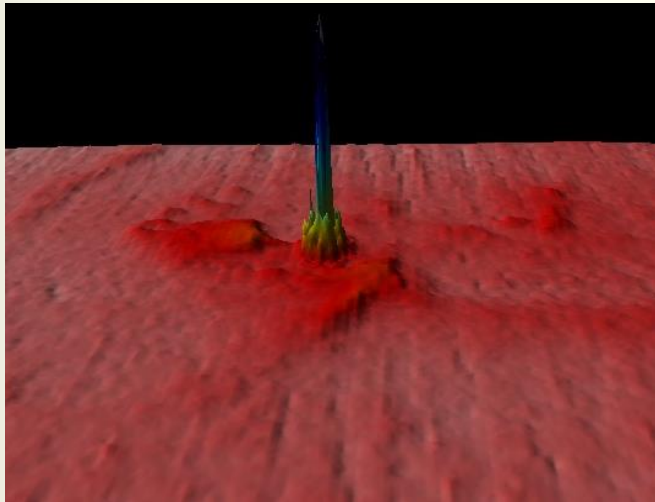
## Sample Video of Similar Job



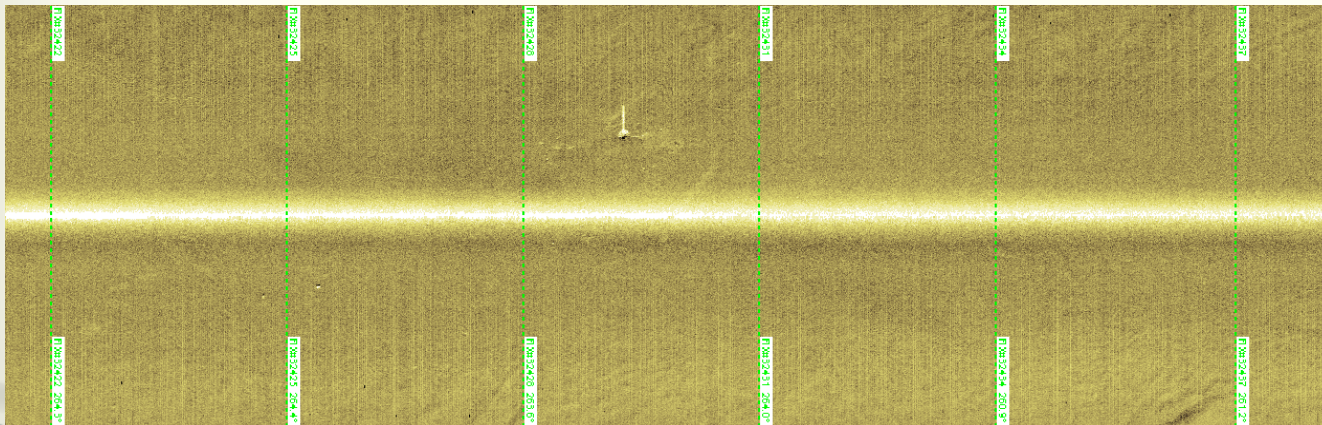


# Survey for Marine Habitant/ Archaeology

## Sample Photo of Similar Jobs around Appraisal Well Structure



**MBES Data & Profile**



**SSS Data**



**Visual Survey**

# Survey for Marine Habitant/ Archaeology

Sample Video of Similar Jobs around Appraisal Well Structure



# Geotechnical Survey

## Vessel & Objectives



- ✓ To Obtain Nature of Soil Deposit
- ✓ To Identify Depth and Thickness of Various Soil Strata
- ✓ Collection of Soil and Rock Sample and Determination of Engineering Properties
- ✓ In-situ Properties by Field Test





# Geotechnical Survey

## Methodology

### Wire line/ Rotary Drilling



### Cone Penetration Test (CPT)



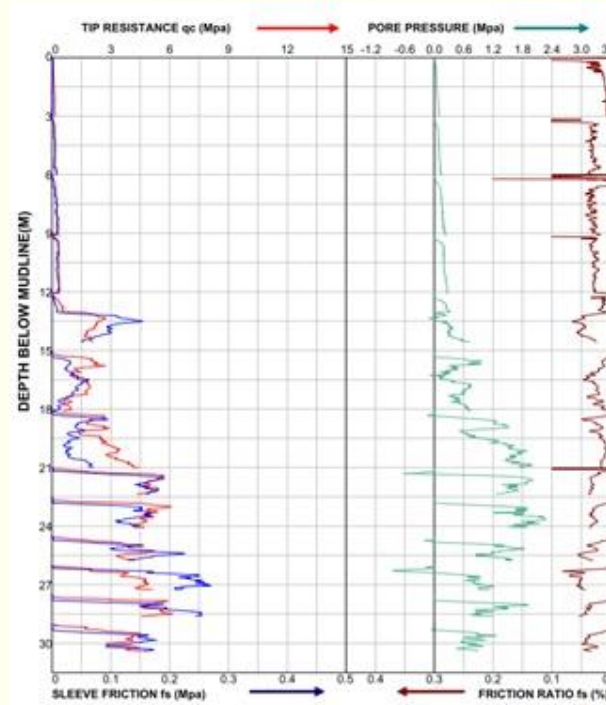
### Drop/Vibro Coring



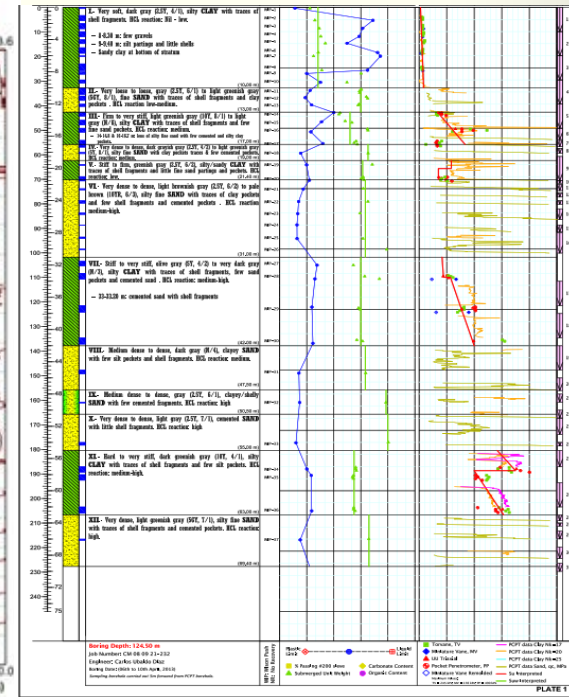
# Geotechnical Survey

## Final Report & Results

- ☐ Operation Summary
- ☐ Vessel/Equipment/Personnel
- ☐ Survey Methodology
- ☐ Survey Results:
  - ✓ Details of Soil Parameters
  - ✓ Details of Layers Sediment
  - ✓ Onboard Lab. Test Results
  - ✓ Onshore Lab. Test Results



Graph of CPT Data



Borehole Log





# Question/Answer



# Thanks for Your Kind Attention

*February 2021*