



# 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.**

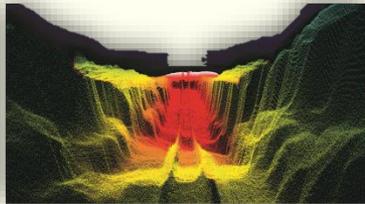
CEO: Capt. M.R. ILIATI

Operating in Middle East

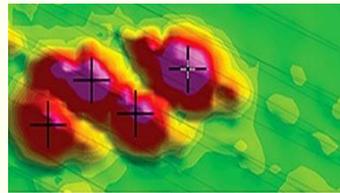
Dubai, UAE

[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



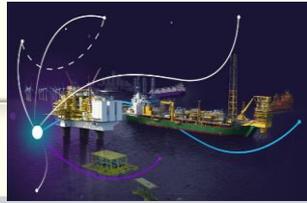
Positioning Services

# 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

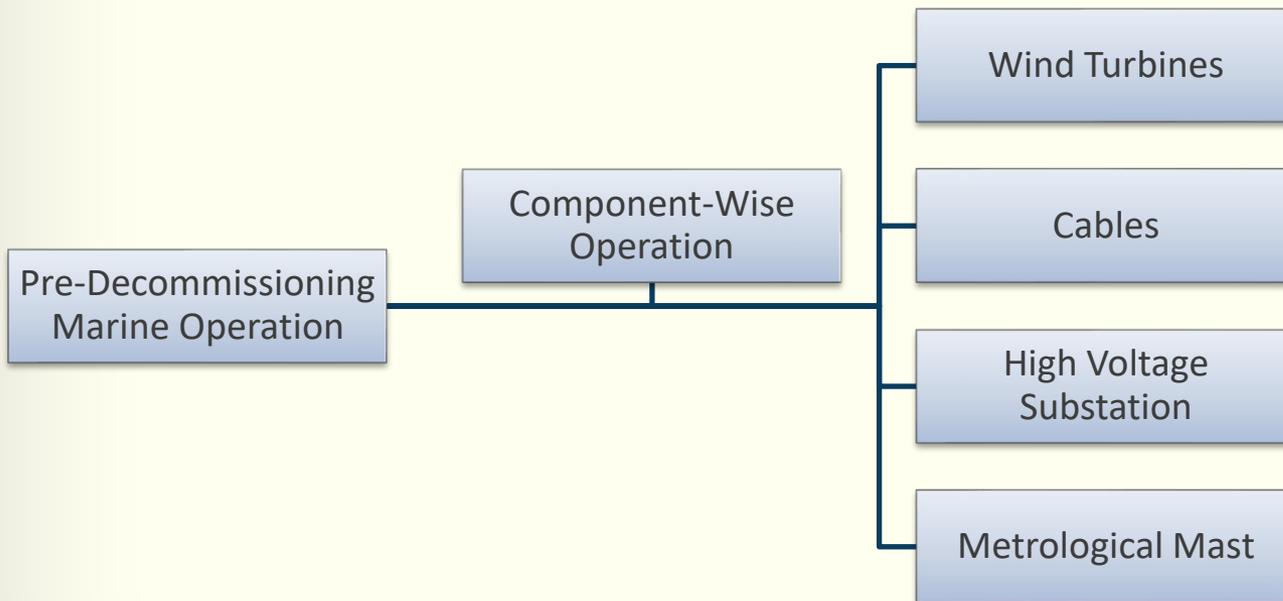
- Geophysical Survey
- Seismic Survey
- Geotechnical Survey
- Rig Positioning

- Geophysical Survey
- Geotechnical Survey
- Rig Positioning
- Construction
- As Built Survey

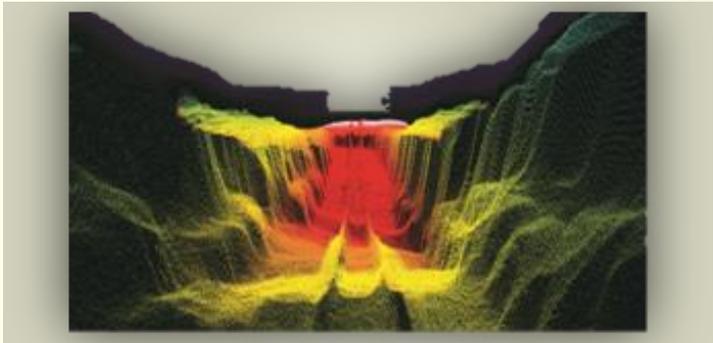
- Geophysical Survey
- Geotechnical Survey
- Rig Positioning
- Construction
- As Built Survey
- Asset/Structures Inspection

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

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



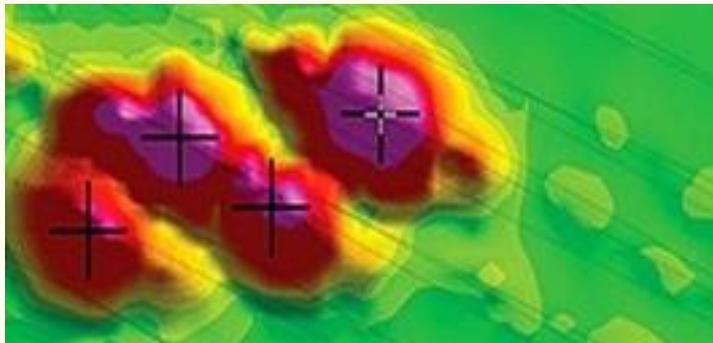
# Seabed Survey Categories for Pre-Decommissioning of OWP Components



**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



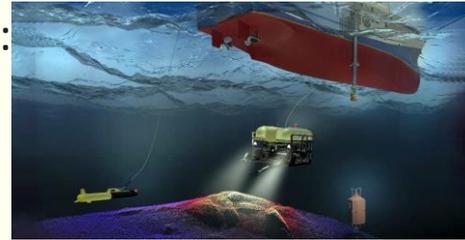
# Geophysical Site/Route Survey

## 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

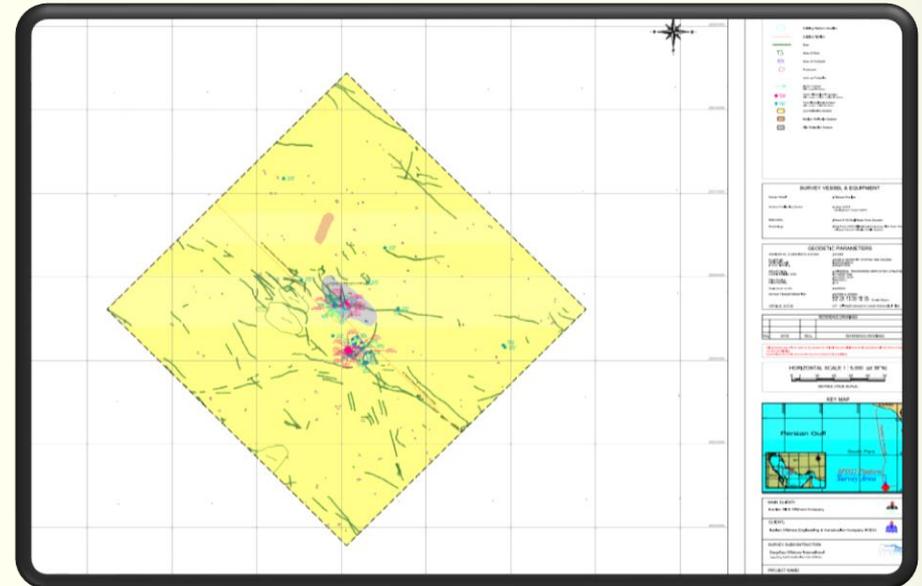


# Geophysical Site Survey

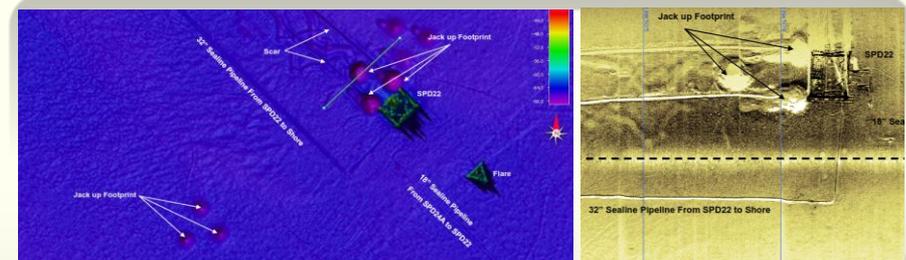
## Final Reports and Delivery

### ❖ 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

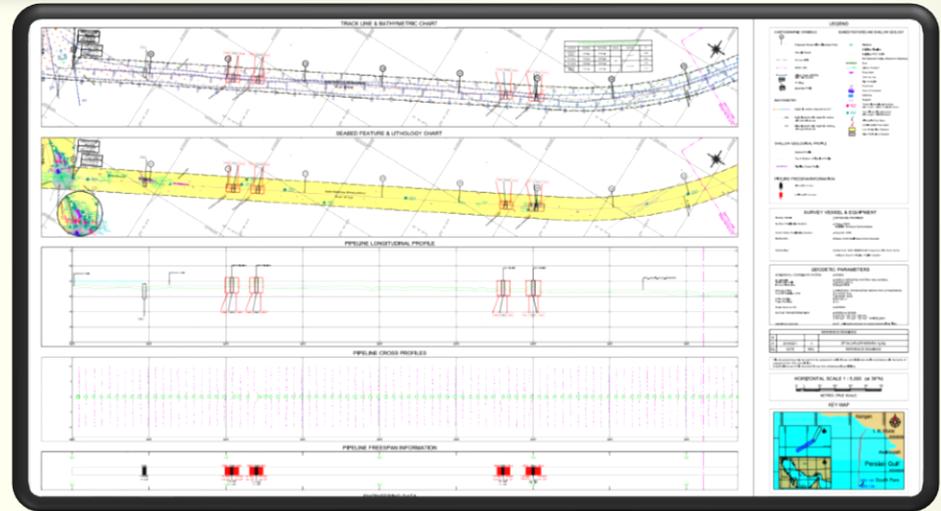
SSS Data

# Geophysical Route Survey

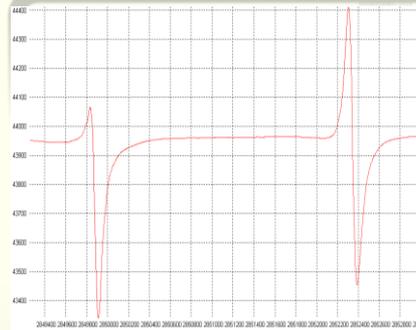
## Final Reports and Delivery

### ❖ Route Survey Along the Cable Route:

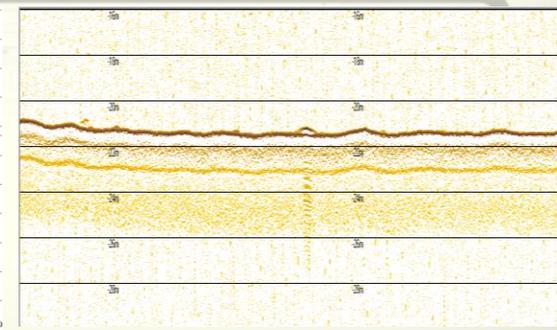
- Operation Summary
- Vessel/Equipment/Personnel
- Survey Methodology
- Survey Results:
  - ✓ Seabed Topography
  - ✓ Details of Found Objects/Debris/Structures
  - ✓ Condition of Sub-Layers
  - ✓ Details of Detected Magnetic Anomalies
  - ✓ Burial Depth of Cable
  - ✓ Details of Crossing
  - ✓ Alignment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



Alignment Sheet Chart



Maggy Data



SBP Data

# UXO Survey

## Plan & Methodology

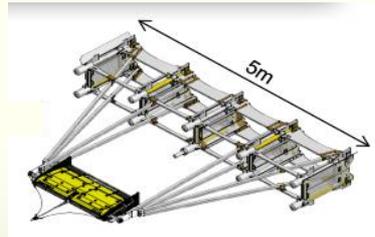
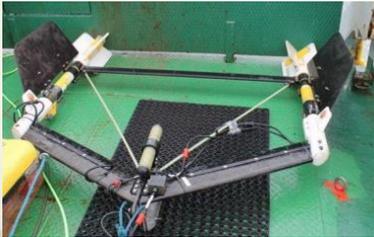
### ❖ UXO Survey Planning:

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

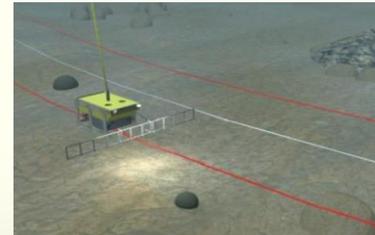


### ❖ UXO Survey Methods:

#### Towed Gradiometer



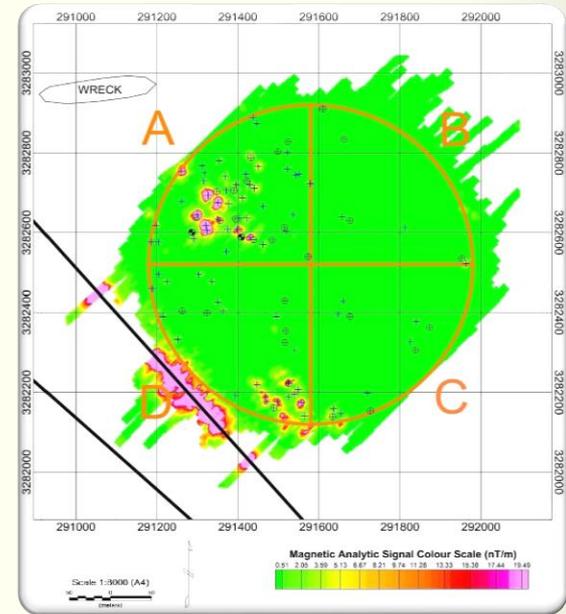
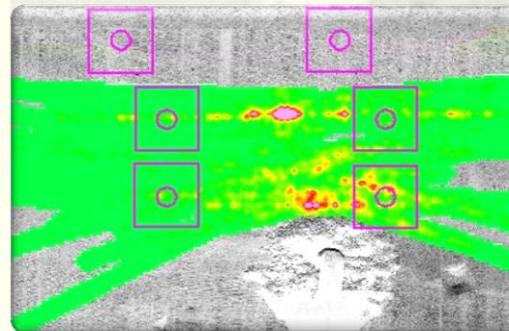
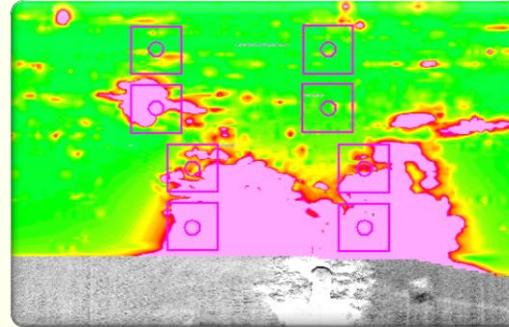
#### ROV Mounted Gradiometer



# 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

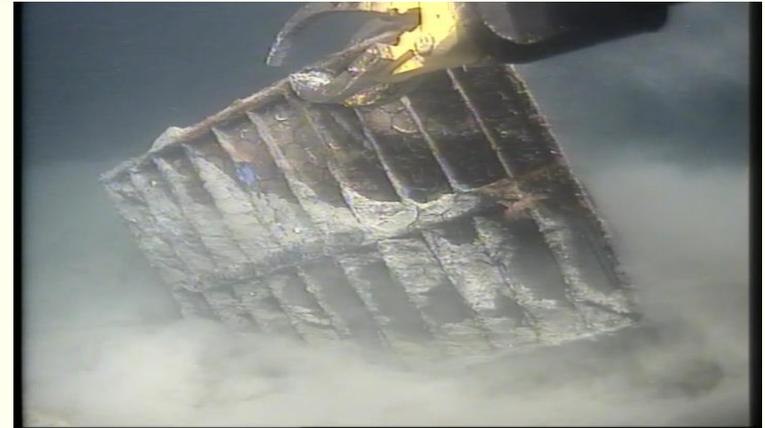
### ROV Benefits Vs. Diver:

- 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



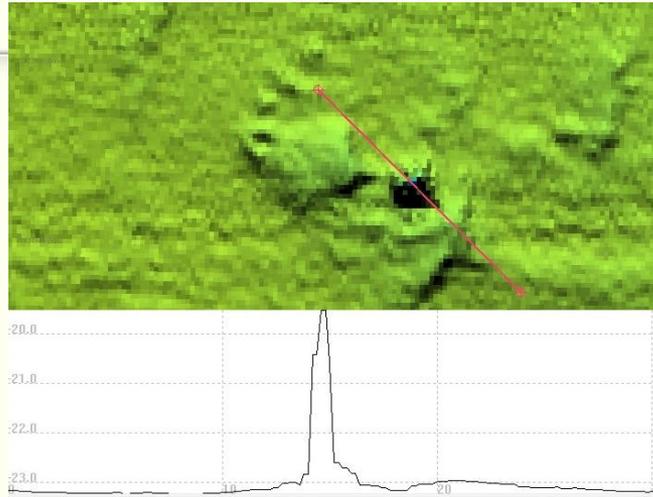
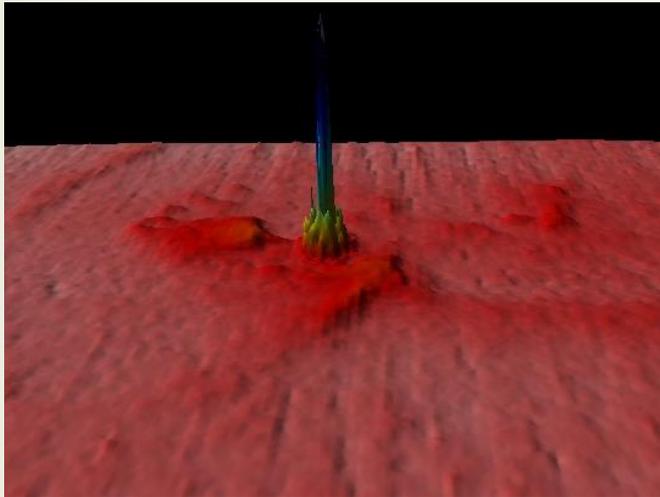
# ROV Debris Removal Operation

## Sample Video of Similar Job



# Survey for Marine Habitant/ Archaeology

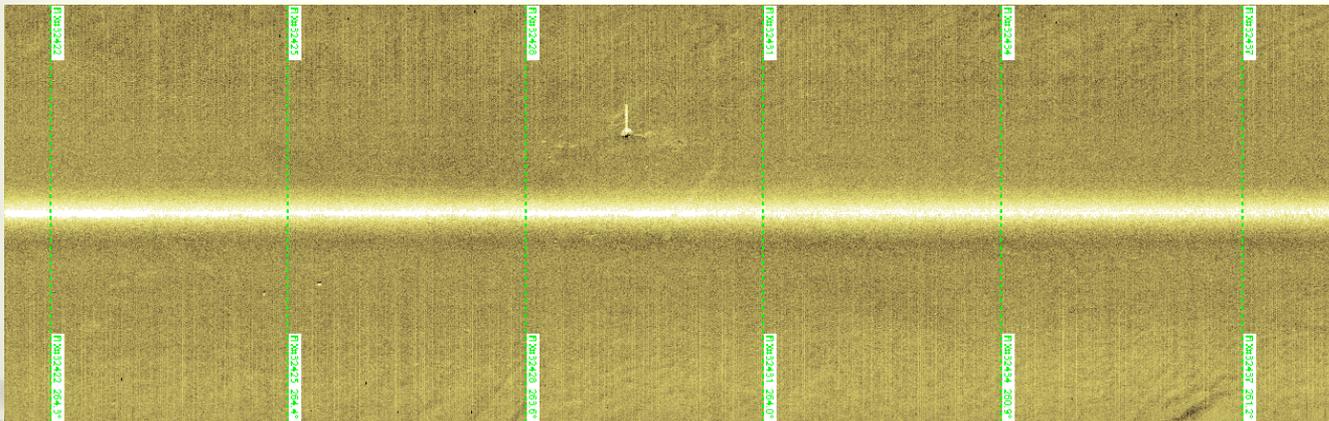
## Sample Photo of Similar Jobs around Appraisal Well Structure



**MBES Data & Profile**



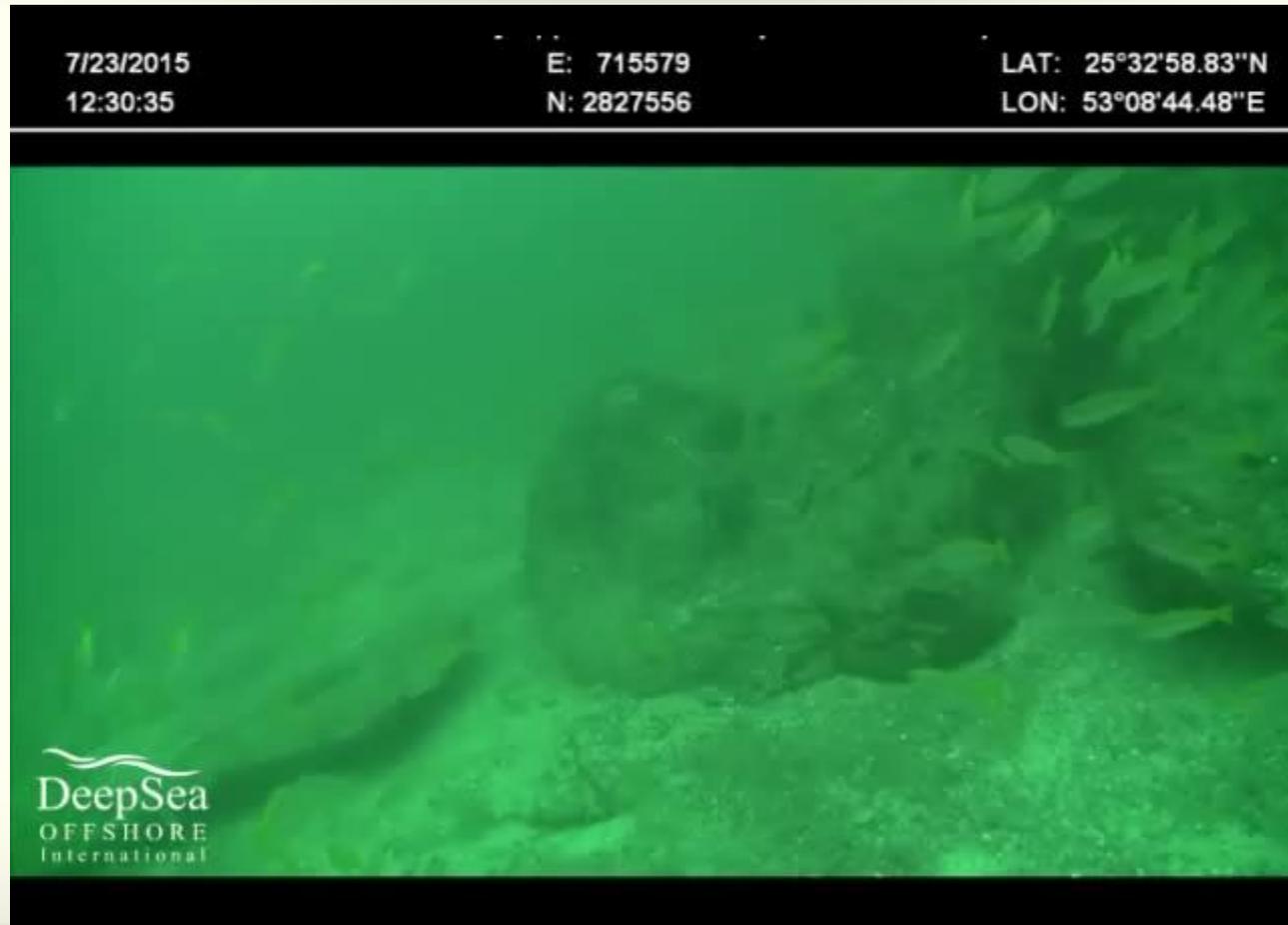
**Visual Survey**



**SSS Data**

# 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

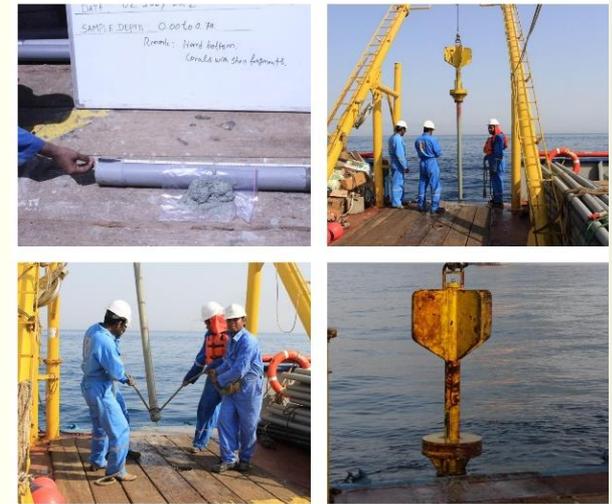
### Wire line/ Rotary Drilling



### Cone Penetration Test (CPT)



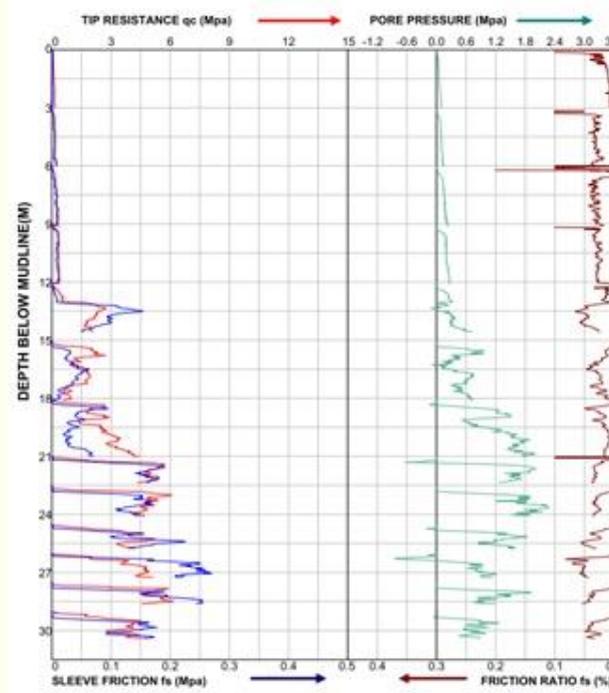
### Drop/Vibro Coring



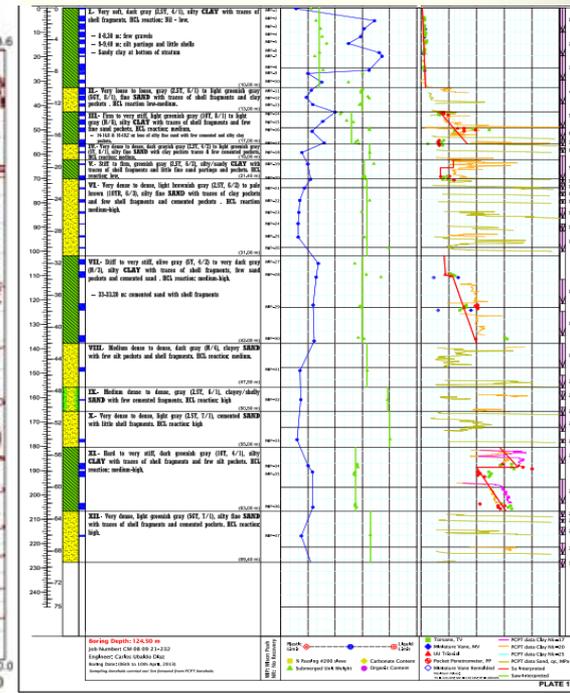
# Geotechnical Survey

## 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*