

Mini-ROV Tool for Offshore and In-Tank Inspections



VESTERA RESOURCES SDN BHD

www.vestera.com.my

Current Inspection Methods: External



Divers



**Conventional
Work-class
ROVs**



Current Inspection Methods: In-Tank



Staging



Rope Access



Rafting



Key Advantages of Mini-ROV



VS.



1. **Safety - No tank entry, no personnel underwater, no personnel working at height**
2. **Able to operate without costly support –No vessel support , crange or hyperbaric chamber required**
3. **Significant savings –2 personnel only and Shorter inspection durations (TIME & COST)**
4. **Minimal impact/disruptions to operations**
5. **Rapid Mobilization –Immediate/emergency deployment anywhere in the world**
6. **Fully documented results –captured images and recordings that can be reviewed by off site personnel. Real-time if internet connection available.**

A Better Inspection Method – In Tank and External



Mini ROV



**A Closer
look**



Overview of the Mini-ROV System

- 1 complete system fits into 2 packages - 45 kg total
- All equipment checked into commercial flights
- Typically operated by only 2 personnel

Lightweight / Compact ROV

- Maximum depth 1000 ft (305 m)
- Up to 4 knots speed
- Operating range -2°C to 79°C
- Camera for visual/recording
- Equipped with 3 thrusters
- LED lighting



Tether

- Upto 2000 ft (600 m)
- Transmits power, communications, and video
- Multi-segmented tether, with safety clips



Control box / Computer

- Uses 110-240V 50/60hz -similar to laptop
- Joystick controller
- Receive and store images / video / data
- Able to record audio as ROV operates
- Calculates depth / bearing / height

Intervention Class High-Spec Mini-ROV System

Control box / Computer

- Uses 110-220V 50/60hz – similar to laptop
- Joystick controller
- Receive and store images / video / data
- Able to record audio as ROV operates
- Calculates depth / bearing / height

- 1 complete system fits into 3 packages - 70 kg total

- All equipment checked into commercial flights

- Typically operated by only 2 personnel



Tether

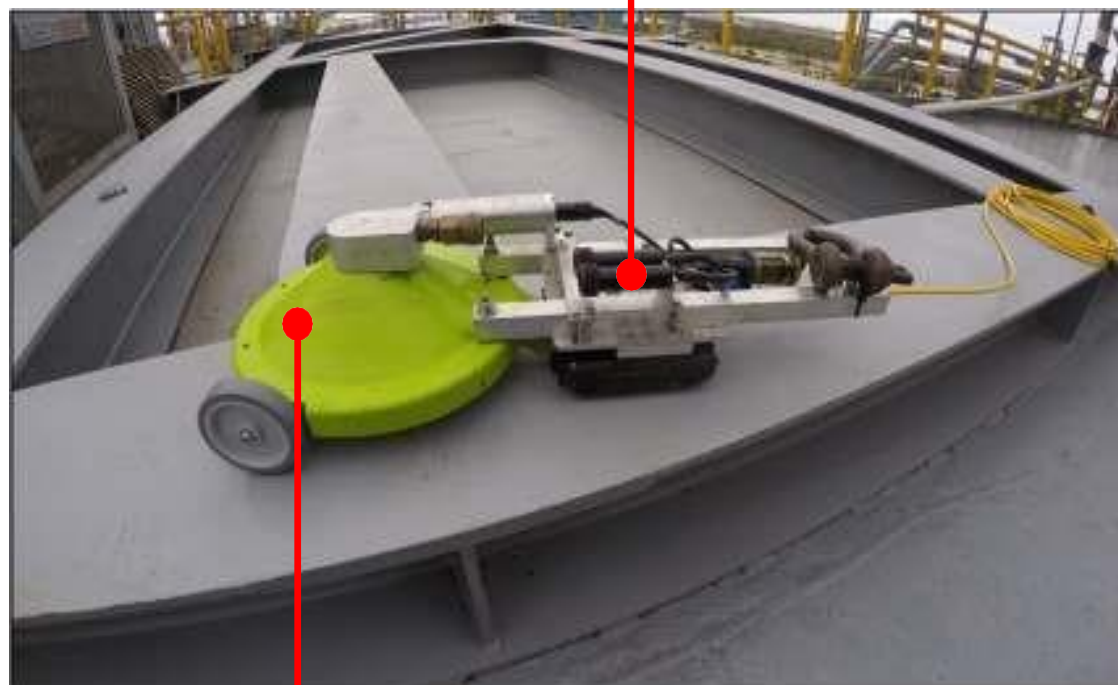
- Standard up to 2000 ft (600m)
- Transmits power, communications, and video
- Optic Fiber option to drastically increase distance
- Multi-segmented tether, with safety clips

Intervention Class Mini-ROV

- Maximum depth 2500 ft (760 m)
- 59lb thrust forward
- Operating range -2°C to 79°C
- Equipped with 6 thrusters for high stability in strong currents / intervention work
- LEDlighting arrays, 2 x 38 watts

Magnetic Underwater Crawler (MUC) – Both Wet & Dry Conditions

Amphibious type crawler unit to complement ROV in areas a traditional ROV cannot reach/perform.



MUC

- Track-mounted
- Electronic magnet provides strong adhering capability to metal surfaces – vertical crawl
- Variety of tools can be mounted on the MUC

Cleaning Dome

- Cavitation to clean in both submerged and dry surfaces and conditions

Control Station

Can be situated at any location.

- Maximize Safety
- Minimize Operational Disruptions



ROV Launch and Recovery

**Manual lowering and retrieval
from water.**

**No Launch and Recovery
Systems (LARS) required.**

**No material handling
equipment required.**



Benefits



NO OPERATIONAL IMPACT

Proceanic's ROV services can be completed with little to no impact on operations, reduced POB, and negligible deck space needed.

- ✓ Hand Launched, No LARS Needed
- ✓ Small 3-Man Teams



COST SAVINGS

Proceanic's production clients have found up to a 60% cost savings utilizing mini-ROV's for routine inspection services.

- ✓ No ROV Boat Needed
- ✓ Cost-effective services



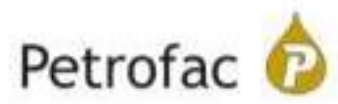
CLASS APPROVED

One ABS inspector said, "Proceanic's mini-ROV inspections have proven to be as good or better than traditional diver or in-person inspections."






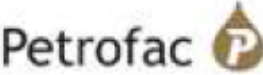








- ✓ Class Approved by ABS & DNV
- ✓ 29+ UWILDS accepted
















Track Record














Track Record

Project	Client	Class Society	Structure Type	Scope of Work	Year
Anda Raya 		-	Bulk Carrier	<ul style="list-style-type: none"> • Visual Inspection Hul / Bottom Survey • Propeller and rudder visual inspection 	Nov 2018
Drydock 		-	Dry dock	<ul style="list-style-type: none"> • Visual inspection and maneuverability test for Dry Docking Operations 	Nov 2018
West Desaru MOPU (Malaysia) 		-	Wellhead Platform	<ul style="list-style-type: none"> • Gas Sampling / Bubble capture at -60m • Visual Inspection WDM Wellhead Support Structure (WSS) • Visual WSS Export Flexible Riser • Cendor FPSO - Visual Inspection of Gas Lift Riser, Water Injection Riser, Production Riser 	Oct 2018
Nansen Spar 		-	Spar	<ul style="list-style-type: none"> • Observation Camera Install – Buoyancy Cans 	Oct 2018
Erha FPSO 			FPSO	<ul style="list-style-type: none"> • Riser Cleaning • Riser Inspection • Riser Porch Inspection 	Oct 2018
Magnolia TLP 			Production TLP	<ul style="list-style-type: none"> • Marine Growth Cleaning and CVI of hull critical weld connections • GVI of general hull and tendon connections • GVI of Risers and Tendons to -300 ft • CP Readings of hull, anodes, tendons, and risers • Marine Growth Measurement • Sea-Chest Cover Removal and Sea-Connection Plugging 	Aug/Sept 2018

Track Record

Project	Client	Class Society	Structure Type	Scope of Work	Year
 <p>Bunga Pakma Conductor Installation</p>	 <p>REPSOL</p>	-	Drilling Rig	<ul style="list-style-type: none"> • Conductor Driving Inspection (7 Conductors) • Conductor pre-Drive Heading Verification • Platform structure base Inspection • Debris survey and clearance 	April 2018
 <p>Scotford Water Tank</p>	 <p>Shell</p>	-	Refinery Water Tank	<ul style="list-style-type: none"> • General Visual Inspection • Close Visual Inspection • UT Thickness Gaugings 	April 2018
 <p>Nansen Spar</p>	 <p>Anadarko Petroleum Corporation</p>	-	Spar	<ul style="list-style-type: none"> • Air Injection, Visual Inspection – Buoyancy Cans 	Mar 2018
 <p>Kapal Field</p>	 <p>VESTIGO Investigate, Seek, Explore</p>	-	Decommissioning Field Inspection	<ul style="list-style-type: none"> • Close Visual Inspection of 5 decommissioned conductor slots • Close Visual Inspection of flowline 	Mar 2018
 <p>ENSCO DS-8</p>	 <p>ENSCO</p>	 <p>ABS</p>	Drillship	<ul style="list-style-type: none"> • GVI of hull, thrusters, seachests, discharges, and moonpool • UWILD for 1st Intermediate Survey • Inspection of ballast tanks, including UT Gaugings • Vessel Status: Offshore, Angola 	Feb 2018
 <p>Nansen/Boomvang & Gunnison Spar</p>	 <p>Anadarko Petroleum Corporation</p>	-	Spar(s) 3	<ul style="list-style-type: none"> • Visual inspection of Risers, Buoyancy Cans • Visual inspection from surface to -180ft 	Jan 2018

Track Record

Project	Client	Class Society	Structure Type	Scope of Work	Year
700mm Potable Watermain ECP 		-	700mm Watermain at Tanah Merah Country Club / ECP	<ul style="list-style-type: none"> • Inspection and condition assessment of 700mm potable watermain 	Oct 2017
Constitution Spar 		-	Spar	<ul style="list-style-type: none"> • Visual inspection of Risers, Buoyancy Cans • Visual inspection from surface to -180ft 	Oct 2017
Mad Dog Spar 			Spar	<ul style="list-style-type: none"> • Ballast Tank Inspection • UT Gauging 	Sep 2017
Kinabalu Field Conductor Installation 		-	Drilling Rig	<ul style="list-style-type: none"> • Conductor Driving Inspection (14 Conductors) • Conductor pre-Drive Heading Verification • Platform structure base Inspection 	Sep 2017
Ophir Bualuang Field Subsea Survey 		-	Pipelines and Jacket	<ul style="list-style-type: none"> • Flexible Riser visual inspection • Survey two 2.5 km-long pipelines • Spot cleaning and flooded Member Detection (FMD) for Alpha platform • Subsea visual and location survey of SPC and pipeline terminations • Anode Close Visual Inspection, measurement 	Sep 2017

Track Record

Project	Client	Class Society	Structure Type	Scope of Work	Year
Suksan Salammander FSO 			FSO	<ul style="list-style-type: none"> • Marine growth spot-cleaning of Mooring Chain for thickness measurements • Thickness Measurements of Mooring Chain performed by Mini-ROV mounted calipers • Mooring Chain angle measurements • Visual Inspection of Mooring Chain from waterline to touchdown point (-60m) 	Aug 2017
Stena Carron 			Drillship	<ul style="list-style-type: none"> • Place and remove through-hull pipe plug for sea valve replacement • Vessel Status: On DP, 	Aug 2017
West Desaru MOPU (Malaysia) 		-	Wellhead Platform	<ul style="list-style-type: none"> • 3 Conductor General Visual Inspection (GVI) • 1 Conductor Close Visual Inspection (CVI) • Riser General Visual Inspection • Riser Close Visual Inspection of suspected breach area • Gas Sampling 	July 2017
Discoverer Inspiration 			Drillship	<ul style="list-style-type: none"> • Seachest Cleaning • Sea Connection Plugging for valve maintenance (10 Valves, 4" to 22") 	June 2017
Jack St. Malo 		-	Semi-Sub	<ul style="list-style-type: none"> • Subsea Valve Cleaning and Inspection 	June 2017

Mini-ROV Inspection Services –Class-approved



Certificate Number: 16-1153182963-B

ABS Port Office: Houston Port

Effective Date: 11 August 2016

Service Provider's Address: 712 Main Street Suite 2150, Houston TX 77002 USA

Service Provider's Website: www.proceanic.com

Unless cancelled earlier, this certificate expires on 10 August 2019

For particulars regarding this recognition, see the ABS web site: www.eagle.org

Certificate of Service Recognition

This is to Certify that

Proceanic Ltd.

having been audited by ABS and having given a satisfactory practical demonstration of the service listed below, is recognized by ABS as a Service Provider to provide services which ABS Surveyors may rely on to make decisions affecting classification or statutory surveys.

Remote Survey Techniques

It is the responsibility of the Service Provider to employ, train and qualify persons in the service provided. If the service requires approval from manufacturers, the service provider is responsible to maintain contact with the manufacturer and maintain any service manuals up to date. The employees who will conduct the servicing are to have photo identification and, if allowed, be listed on the company's web site (noted above). The products and models allowed to be serviced are to be listed on the company's web site. The ABS office issuing this certificate is to be kept updated with changes to the management of the company, its employees, products and models on the list and any changes made.

Note: Please refer to the ABS web site: www.eagle.org for any comments regarding the services provided.

Service Recognition for ROV UWILD of MODU only

Stephen Reddy, Surveyor



Mini-ROV Inspection Services –Class-approved



DET NORSKE VERITAS
Date of Issue: 2014-05-29

SERVICE SUPPLIER SURVEY
Documented system (Ref IACS UR Z17, as amended)

Type of Survey: Initial Survey Retention Survey

Service Supplier: **Proceanic, Ltd 712 Main St Ste 2158 HOUSTON TX 77063-2006, United States**

Approval Programme No.: **452A - Ultrasonic Thickness Measurements of Ship's Structure, classed by the Society, in accordance with Approval Programme No. 452A.**

Service Supplier Certificate No.: _____

Service Supplier Certificate Expiry date: _____

Survey Item	Yes	No	N/A	Remarks
Has the supplier a quality system complying with current version of ISO 9001 series?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	901-QA-MAN-PRD-001, Not certified to ISO 9001
Are quality policy and quality objectives for the organization documented?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	901-QA-MAN-PRD-001 (1.1), (1.2) PRC-VR-2013-001-PR-0198
Exist code of conduct for relevant activity?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0198
Is a quality manual established and maintained?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	901-QA-MAN-PRD-001
Is appropriate communication within the organization established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	901-QA-MAN-PRD-001
Is a documented procedure established for conducting internal audits and conducted at planned intervals?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	901-QA-MAN-PRD-001 (18) PRC-VR-2013-001-PR-0198
Verify quality management of subsidiaries and agents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No subsidiaries or agents used
Are procedures for inspection and control of deliveries from subcontractors and agents established and followed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No subcontractors or agents used
Is training programmes for operators/technicians/inspectors established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (4), (Appendix B)
Review records of the approved operators/technicians/inspectors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0198 (14), (Appendix B)
Supervision and verification to ensure compliance with operational procedures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (4.1)
Are inspection and test results recorded, reported and documented properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (5), (Appendix F)
Is service equipment functioning satisfactorily and program for maintenance and calibration established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (3.2)
Is job preparation documented?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (6), (Appendix F)
Has the supplier a program for periodic review of work process procedures, complaints, corrective actions, and insurance, maintenance and control of documents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	001-QA-MAN-PRD-001 (7) PRC-VR-2013-001-PR-0199 (5.1), (5.2), (5.3)
Has the supplier the necessary statutory and other documents related to the service?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PRC-VR-2013-001-PR-0199 (6), (Appendix F)
Review introducing of processes and evaluation of such processes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No outsourcing done

DET Norske Veritas AS, Solheimsgaten 1, NO-1322 Høvik, Norway, Tel: +47 07 27 96 00, Fax: +47 07 27 96 11, Org No: NO 949 748 051 MVA, www.dnv.com
Form No.: 20.14a Issue: January 2012 Page 1 of 2

Service Supplier: **Proceanic, Ltd 712 Main St Ste 2158 HOUSTON TX 77063-2006, United States** Date of Issue: 2014-05-29

Survey Item	Yes	No	N/A	Remarks
ITEMS CONNECTED TO ACTUAL APPROVAL PROGRAMMES				
Approval Programme 405 Fire Extinguishing Systems				
Documents and approval from manufacturer for each system they are certified to do service on. (Type of system and equipment they are approved to do service on and any limitations to be listed in the appendix to the certificate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Approval Programme 405a Radio Communication Equipment				
Is a written Procedure for survey of radio equipment established? (Ref. requirements given in IS-6-3.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are all relevant Forms for reporting available and updated? (includes OHS226, OHS230, MCO 349)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Has all relevant documentation been reviewed by DNV with a satisfactory result? (Ref. IS-6-3.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Approval Programme 406a Automatic Identification System (AIS)				
Is a written Procedure for survey of AIS established? (Ref. requirements given in IEC 2.5, approval programme no. 406)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are all relevant Forms for reporting available and updated? (includes AI2001a)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Has all relevant documentation been reviewed by DNV with a satisfactory result? (Ref. IS-6-3.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Approval Programme 407 Life Saving Equipment				
Documents and approval from manufacturer for type of equipment they are certified to do service on. (Type of equipment they are approved to do service on and any limitations to be listed in the appendix to the certificate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Approval Programme 412 VDR				
Check that the instructions and survey checklist being used for annual surveys are approved by DNV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Check that up-to-date files of CoCs are maintained and being traceable to the actual ship survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other items that may be reported				
Other IACS Approvals for 402A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ABS
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Confirmation				
On the basis of the above, it is confirmed that the Service Supplier has a quality system as required by IACS UR Z17 as amended, and a Service Supplier certificate can be issued	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Issued at Houston on 2014-05-29

For Det Norske Veritas AS
Jessie Sango
Jessie Sango
Surveyor

DET Norske Veritas AS, Solheimsgaten 1, NO-1322 Høvik, Norway, Tel: +47 07 27 96 00, Fax: +47 07 27 96 11, Org No: NO 949 748 051 MVA, www.dnv.com
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Mini-ROV Inspection Services –Class-approved



Approval of Service Suppliers

Certificate no: HOU 1800221
Page 1 of 1

Office: **Houston**
Date of issue: **17 May 2018**
This is to certify that: **Proceanic Ltd.**

712 Main Street, Suite 700, Houston, TX 77002, USA. (hereinafter referred to as "Supplier")
Tel: **+1 (713) 223-2340** Fax: **+1 (713) 961-0574** Email: **mgwaller@proceanic.com**

having been assessed hereby receives approval in accordance with the requirements of *Lloyd's Register Procedures for Approval of Service Suppliers* as Supplier from the address(es) listed above for the provision of

In-water survey on ships and mobile offshore units

This approval is conditional upon the Supplier maintaining the documented scheme as audited by any member of the Lloyd's Register Group and hereby approved; and notifying Lloyd's Register in writing of any change to that scheme including any change in personnel, equipment or procedures.

This certificate is issued to the Supplier and, subject to the Supplier complying with the necessary conditions, is valid to the date referred to below.

This certificate is valid until **16 May 2021**

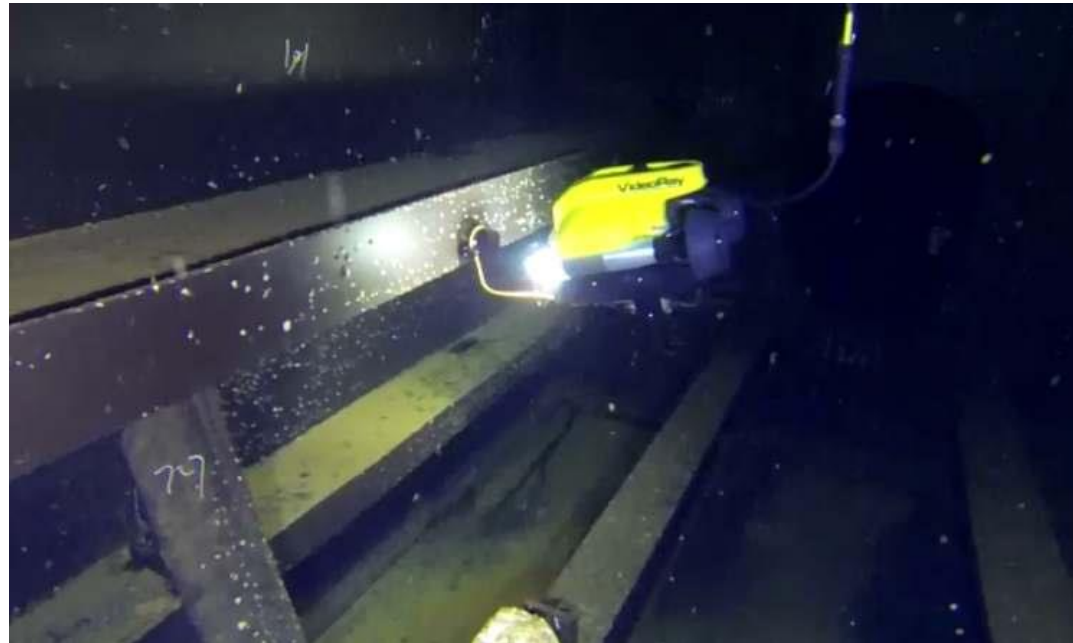
Subsidiary Companies :

- **Proceanic Engineering Services, PTE Ltd., (Singapore)**
- **Proceanic Engineering Malaysia, PTE Ltd., (Malaysia)**

J. Pinzon
Surveyor to Lloyd's Register North America, Inc.
A subsidiary of Lloyd's Register Group Limited



Close-up / General Visual Inspection



Micro-Camera for Inspecting enclosed spaces

Class-approved UWILD, General Visual and Close-up Inspections – External and In Tank



Small & nimble

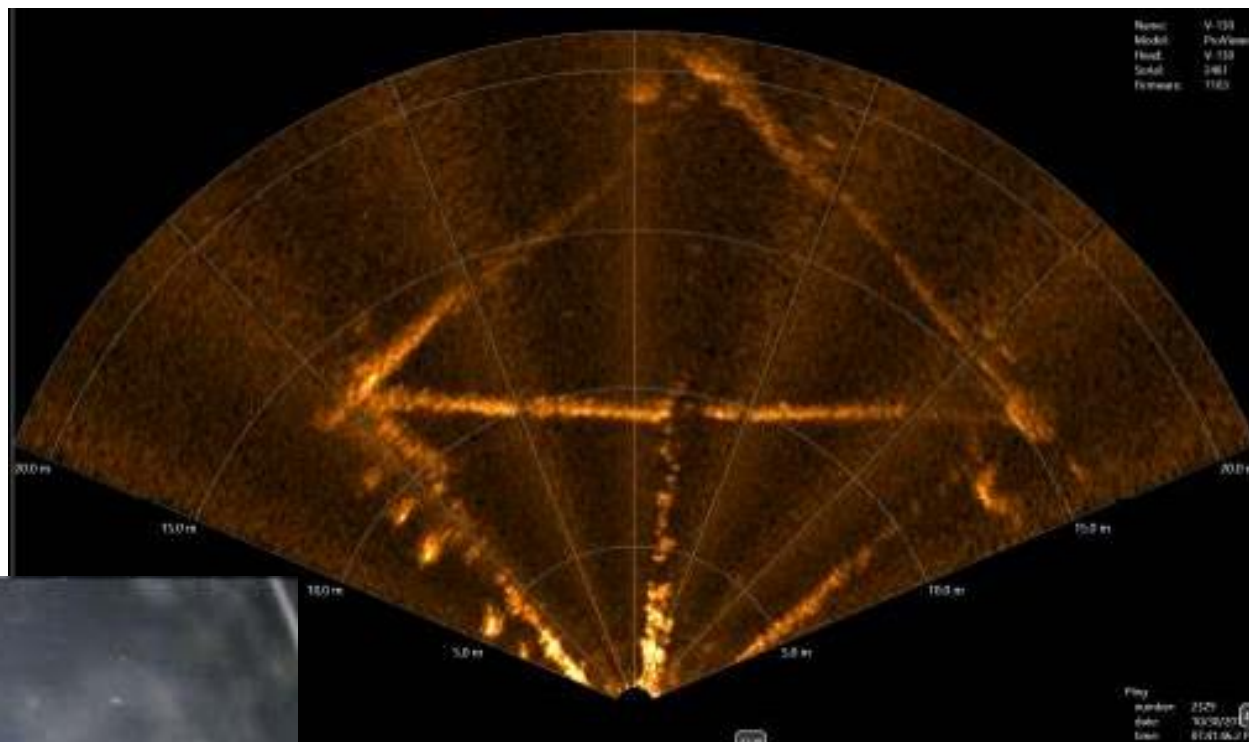
Bellmouth



Inspection

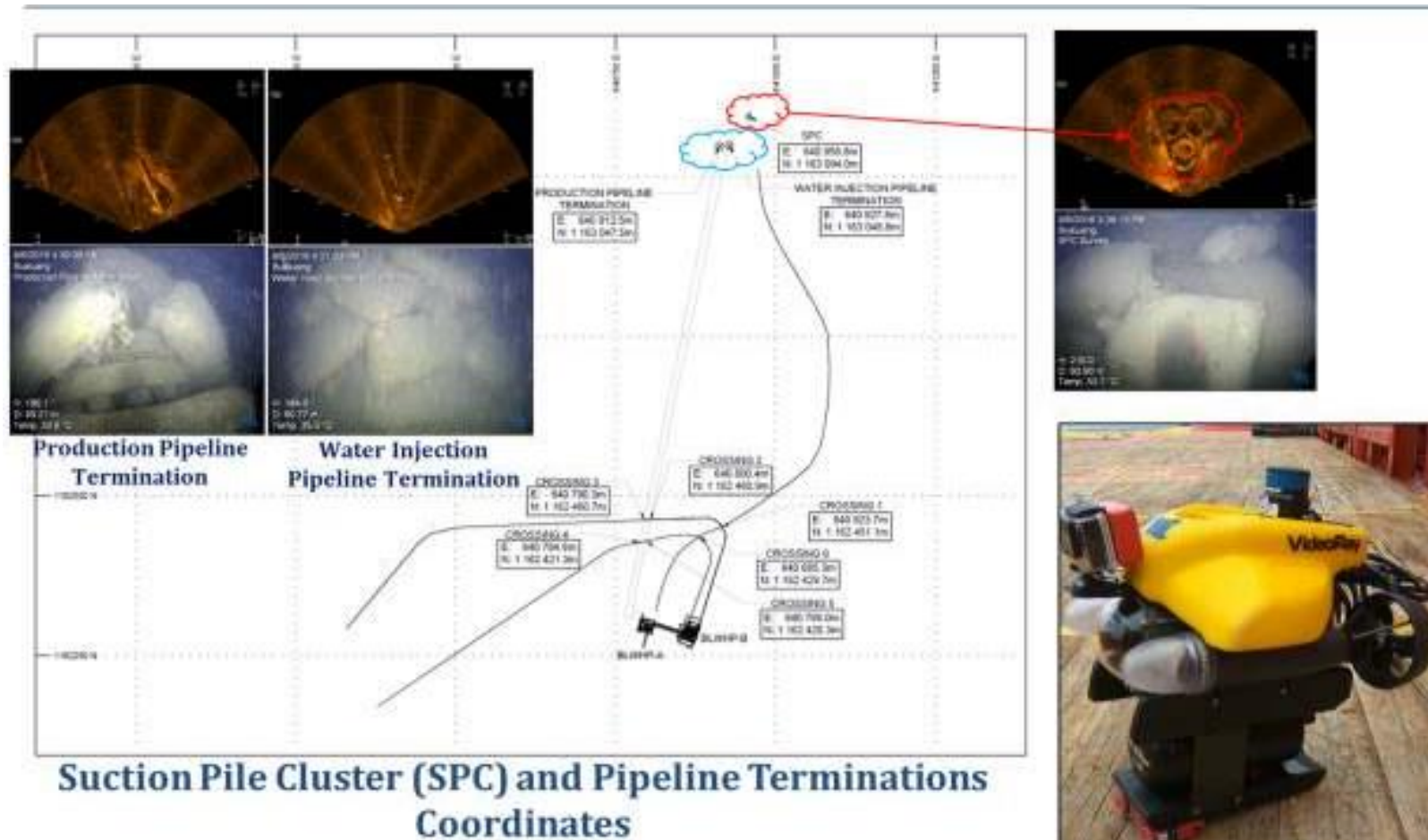
SONAR- Navigation & Dropped Object Location

- **Allows for Navigation in darkness / identify structures not in view**
- **Scan for subsea obstacles and structures**
- **Secondary means of ROV location verification**



Images from night-time inspection of Chevron Thailand's Platong Platform

Sonar & Mobility –Ranged Inspections



Suction Pile Cluster (SPC) and Pipeline Terminations Coordinates

Mini-ROV equipment and team can operate from Field Work Boat to inspect target objectives far from base location platform/vessel.

Accurate Subsea Survey and Positioning - USBL



- Provides location of submerged ROV relative to base station to +/- 0.2m accuracy
- Exact subsea GPS-Coordinates of ROV plotted from base station's position
- Effective up to 150m depth and 500m horizontally

Verify anchor location/drag, subsea pipeline plotting, subsea drilling template, location of dropped object, etc

Ultrasonic-Thickness (UT) Measurements

World's First Class-approved UT Measurements using ROV on an FSO.



- **Receive Class Survey credit – approved by ABS and DNV-GL**
- **Measures through up to 6mm of coating, no damage to coating**
- **All gauging data captured on video recording**
- **Efficient method –shorter duration of inspection than traditional methods**



Marine Growth Cleaning

Marine Growth Cleaning using mini-ROV first successfully used on the ENSCO8505 in October 2014.



Seachest After Cleaning

- Cavitation to remove marine growth
- Seachest cleaning
- Spot-cleaning for critical weld inspection
- Spot cleaning for UWILD

Critical Hull Weld Cleaning



Mooring Chain Cleaning and Measurements



Spot Cleaning of Mooring Chain Prior to Thickness Measurements

[Thickness measurement at chain intersection](#)



Mini-ROV mounted Calipers for Thickness Measurements (ABS approved)



World's First Mooring Chain thickness measurement by mini ROV with Class Approval.

Chain incline Angle Measurements



Sea Valve Plugging



Before Cleaning



After Cleaning



Sea-valve successfully plugged

Mini-ROV capability to firstly clean and then plug sea-valves for maintenance and/or replacement reduce costs to Vessel Operators significantly.

Sea Valve Plugging

Typical Mini-ROV Deployed Plugs



2.5" Plug Installed



22" Plug Installed



Sample Taking – Gas & Water



High-spec Mini-ROV rigged for Gas or Water sampling

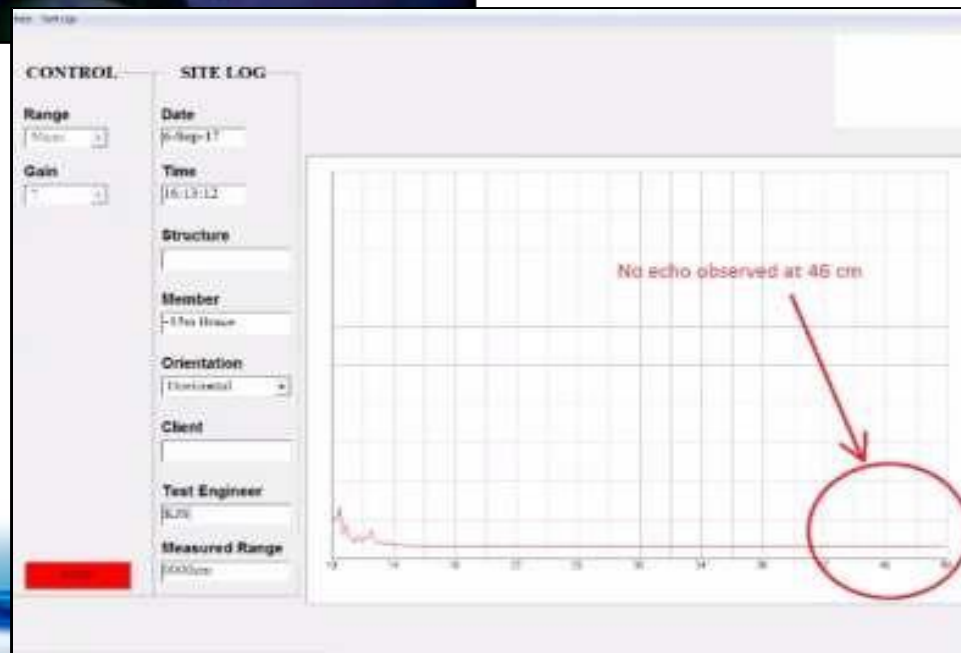


High-spec Mini-ROV ready for subsea gas sample retrieval

Flooded-Member Detection



High-spec Mini-ROV with FMD probe mounted for platform leg reading



FMD read-out live at Surface Control Station

Cathodic Protection Inspection & Assessment



Underwater CP potential measurements

Contact and Proximity Probes

Visual inspection of Anodes

Calculations for remaining life of anodes

Anode replacement Plan



In-Pipeline Inspections



- **Client Complaint – Massive leakage but do not know leakage location**
- **Leakage detected and location marked by distance from ROV insertion point**

Other Functional Accessories



Latches on to ship hulls in high current conditions for stable video inspections. (up to 6 knots current)

Crawler

- **Stability**



Cutter

- **Light Intervention / debris removal**

The razor sharp blade makes quick work of rope or cable up to 0.5in (12.7mm) in diameter and the blade can be changed quickly and easily

Manipulator

- **Light Intervention**



Functions range from untangling tether snags to collecting samples to recovering objects

From the hand controller or control panel, the operator can retrieve items in confined or hazardous locations

Other Functional Accessories



Device for scaling, estimating or measuring applications Scaler

- **Taking subsea Measurements**



Dry Film Thickness Gauge

Non-destructive measurements of coating thickness on all Fe and NFe substrates

Under-water-probe with measuring range 0–2000 µm, optional up to 5000 µm

- **Coating Inspection**



Fluorometer

- **Hydrocarbon / leak pollution detection**

Subsea hydrocarbon / leak detection

Water quality / turbidity monitoring and pollution-level measurement

Class Approval & Sign-off

3.0 GENERAL PARTICULARS

- Ship Name: Pathumabaha
- IMO No: 8767290
- ABS ID: 03113091
- Port of Registry: Panama
- Gross Tons: 36326
- Net Tons: 16431
- Date of Build: 2003

Name of Company Performing Thickness Measurement: Proceanic, Ltd.

Thickness Measurement Company Certification by American Bureau of Shipping: Provisional, Ref ABS Letter Dated 01 July 2013 from Anuj Tandon

Certificate No: Provisional

Certificate Valid From: Pending

Place of Measurement: Songkhla, Thailand Offshore

First Date of Measurement: 6 January 2014

Last Date of Measurement: 15 January 2014

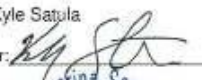
Special Survey No: SCS Hull 3

Detail of Measurement Equipment: Cygnus 1 ROV-Mountable System Serial No 10122,
Cygnus 2 Handsfree Serial No 5808

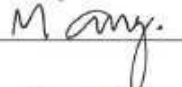
Qualification of Operator: ASNT NDT Level II

ABS Report No. BG 2513257

Name of Operator : Kyle Satula

Signature of Operator: 

Name of Surveyor : Manop Srisungval

Signature of Surveyor: 

Company Official Stamp



Official Stamp:



6th Jan 2014 – 16th Jan 2014
Gulf of Thailand
FSO Pathumabaha

**World's First FSO inspected and
UT gauged by mini ROV with
Class Approval.**



Q&A