



BLOCK C-M-541



SERVICE REPORT – PSV SIEM GIANT (STATION #44)

Client:	Total E&P do Brasil
Client Document Number:	SG-CM541-20-135
Oceaneering Document Number:	200392-OII-RPT-135-R0
Project Name:	C-M-541 Field Development – ROV & Survey Inspections
Vessel:	PSV Siem Giant
Location:	Campos Basin

Rev	Reason For Issue	Author	Reviewed	Approved	Rev Date
0	Issued for Information	SR/GA	LP/SR	EC	27-03-2020



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REVISION HISTORY:

Rev	Sections	Reason for Change	Date
0	ALL	Issued for information	27-03-2020



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C-M-541 BLOCK EBS (Station #44)	
FIELD	LOCATION(S)
C-M-541	Campos Basin

1. INTRODUCTION

1.1. Project Overview

Total E&P do Brasil (Total) has contracted Oceaneering – Marine Production Systems do Brasil (OII) to provide ROV & Survey services for Umbilical, Flowlines and Risers Inspections (UFR) and Field Operations Development at LAPA Field (Production phase) and Block C-M-541 (Exploration phase).

The deep offshore block C-M-541 under exploration is situated in the pre-salt Campos Basin in approximately 3,000m water depth.

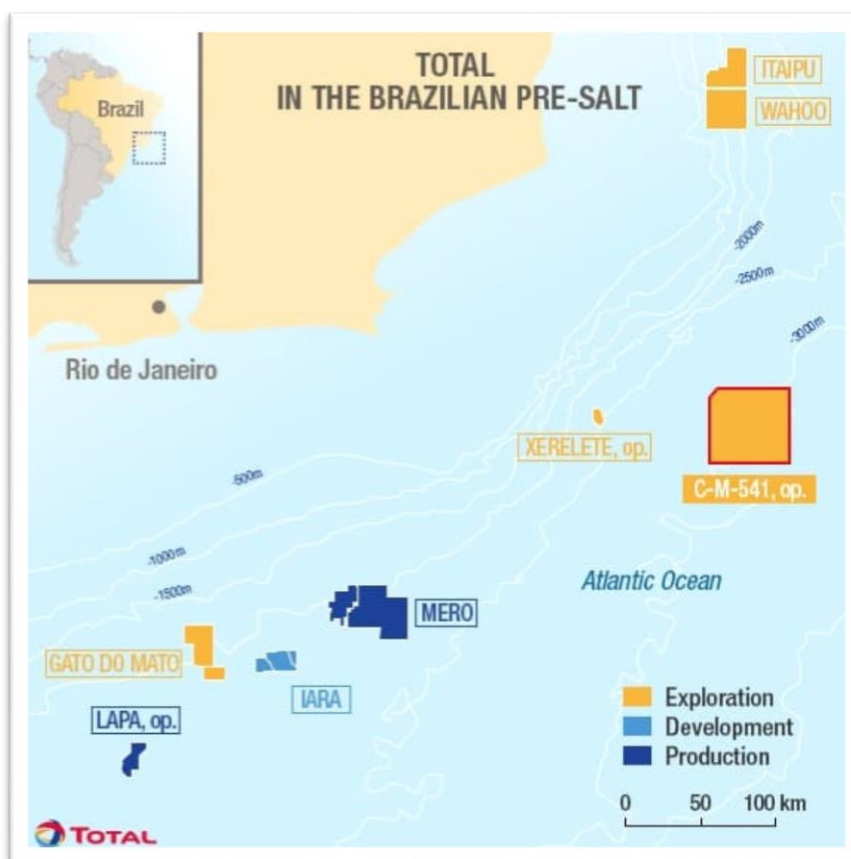




Figure 1 – TOTAL E&P in Brazilian Pre-Salt

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1.2. Scope of Document

The purpose of this document is to present a detailed summary of operations and results acquired by Oceaneering on board of PSV Siem Giant, during the Environmental Baseline Survey (EBS) at Block C-M-541, in search features such as carbonate formation, or any other marine or anthropogenic features that may affect further activities in this area.

1.3. Scope of Work

The Scope of Work comprises in perform a General Visual Inspection (GVI) denominated Environmental Baseline Survey (EBS) in some pre-selected stations and points at the Block C-M-541 in order to present to the environmental agencies and organizations.

The acquisition of video images for the EBS shall follow the lines around the center of each of 09 (nine) pre-selected stations.

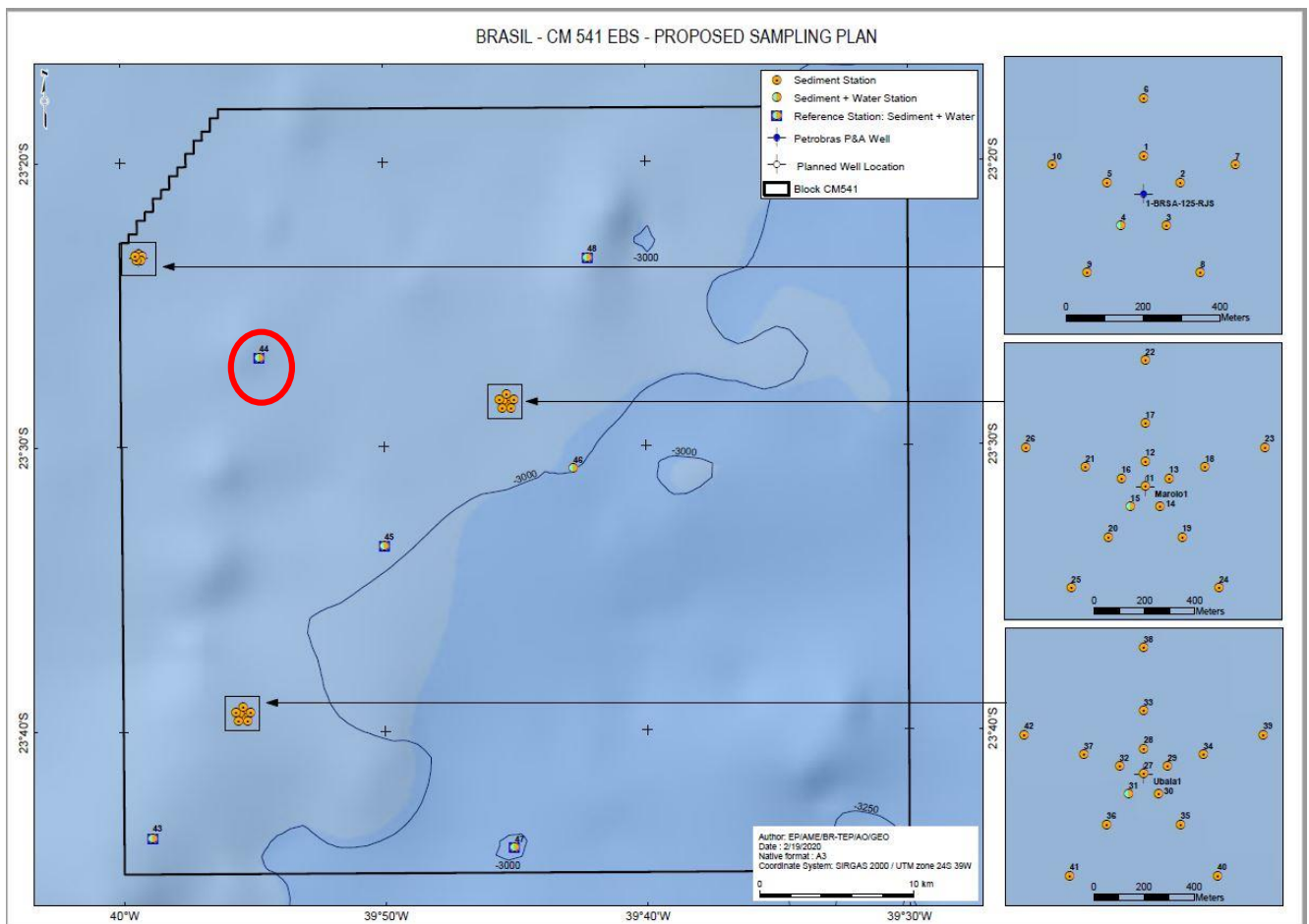




Figure 2 – EBS – Proposal Sampling Plan at Block C-M-541

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2. OPERATIONAL PLAN

It was proposed by the client that this inspection should be performed by ROV on paths along Cardinal Directions (N, NE, E, SE, S, SW, W and NW), and as well a running circles radius around the center point of each station.

The acquisition of images for the baseline survey followed lines around the center of each of the nine stations, similar to the example in the figure below:

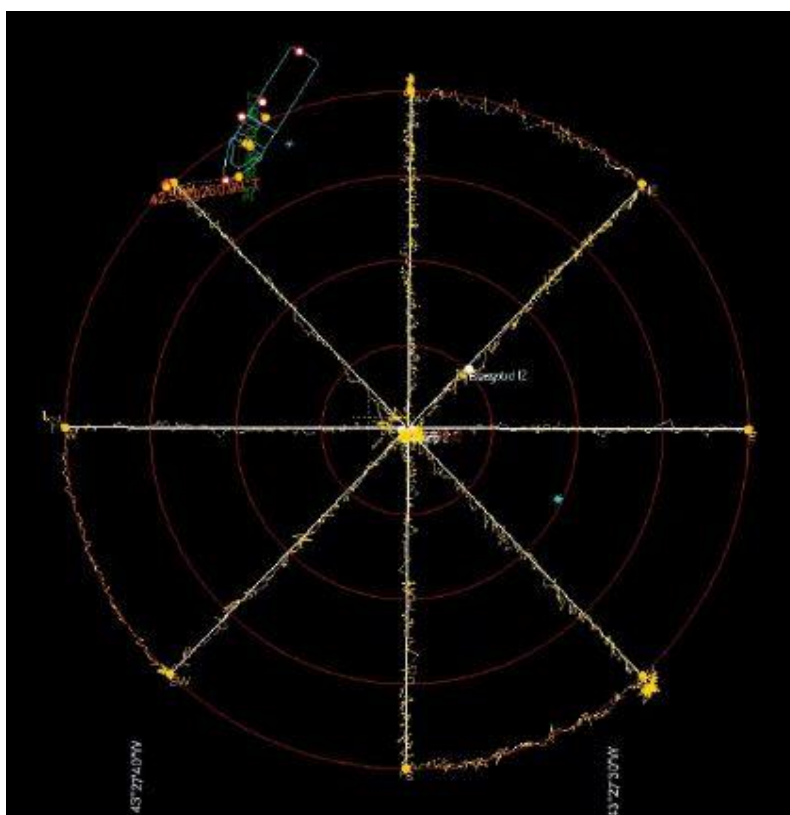




Figure 3 – Example of navigation path during the baseline survey

Instructions were received by client, and proposed coordinates for each survey were indicated on map (**Figure 3**). This report focuses on Station # 44 only.



Station #44					
Northing	Easting	Latitude	Longitude	Estimated Depth	As Found Depth
7.406.579,77	406.814,09	23° 26' 53,14" S	039° 54' 44,31" W	2.890	2.908

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The table below presents all Station positions and points where some close visual inspection and stills need to be performed and taken, respectively. Radial distance from center have different lengths according the client interests.

Sampling Plan of BLOCK C-M-541				
IDENTIFIER	STATION NAME	Radius (m) Distance from center	SIRGAS 2000 UTM 24S	
			X	Y
1	Poço 1-BRSA-125-RJS	200	-39° 59' 18.805"	-23° 23' 16.687"
2	2	200	-39° 59' 15.471"	-23° 23' 18.954"
3	3	200	-39° 59' 16.778"	-23° 23' 22.582"
4	4	200	-39° 59' 20.919"	-23° 23' 22.555"
5	5	200	-39° 59' 22.172"	-23° 23' 18.912"
6	6	200	-39° 59' 18.769"	-23° 23' 11.810"
7	7	200	-39° 59' 10.435"	-23° 23' 17.479"
8	8	200	-39° 59' 13.702"	-23° 23' 26.547"
9	9	200	-39° 59' 24.054"	-23° 23' 26.481"
10	10	200	-39° 59' 27.185"	-23° 23' 17.373"
11	MAROLO 1	400	-39° 45' 19.006"	-23° 28' 27.188"
12	12	400	-39° 45' 18.987"	-23° 28' 23.937"
13	13	400	-39° 45' 15.647"	-23° 28' 26.200"
14	14	400	-39° 45' 16.949"	-23° 28' 29.829"
15	15	400	-39° 45' 21.092"	-23° 28' 29.809"
16	16	400	-39° 45' 22.352"	-23° 28' 26.167"
17	17	400	-39° 45' 18.959"	-23° 28' 19.059"
18	18	400	-39° 45' 10.610"	-23° 28' 24.717"
19	19	400	-39° 45' 13.863"	-23° 28' 33.790"
20	20	400	-39° 45' 24.223"	-23° 28' 33.739"
21	21	400	-39° 45' 27.372"	-23° 28' 24.636"
22	22	400	-39° 45' 18.913"	-23° 28' 10.930"
23	23	400	-39° 45' 2.215"	-23° 28' 22.245"
24	24	400	-39° 45' 8.721"	-23° 28' 40.391"
25	25	400	-39° 45' 29.440"	-23° 28' 40.291"
26	26	400	-39° 45' 35.739"	-23° 28' 22.083"
27	UBAIA 1	400	-39° 55' 26.269"	-23° 39' 24.301"
28	28	400	-39° 55' 26.246"	-23° 39' 21.050"
29	29	400	-39° 55' 22.905"	-23° 39' 23.317"
30	30	400	-39° 55' 24.212"	-23° 39' 26.944"
31	31	400	-39° 55' 28.362"	-23° 39' 26.919"
32	32	400	-39° 55' 29.618"	-23° 39' 23.277"
33	33	400	-39° 55' 26.211"	-23° 39' 16.173"
34	34	400	-39° 55' 17.859"	-23° 39' 21.839"
35	35	400	-39° 55' 21.128"	-23° 39' 30.908"
36	36	400	-39° 55' 31.502"	-23° 39' 30.846"
37	37	400	-39° 55' 34.643"	-23° 39' 21.739"
38	38	400	-39° 55' 26.154"	-23° 39' 8.045"
39	39	400	-39° 55' 9.449"	-23° 39' 19.377"
40	40	400	-39° 55' 15.987"	-23° 39' 37.515"
41	41	400	-39° 55' 36.735"	-23° 39' 37.391"
42	42	400	-39° 55' 43.018"	-23° 39' 19.177"
43	43	200	-39° 58' 55.125"	-23° 43' 44.216"
44	44	200	-39° 54' 44.307"	-23° 26' 53.137"
45	45	200	-39° 50' 0.419"	-23° 33' 31.040"
46	46	200	-39° 42' 46.781"	-23° 30' 49.028"
47	47	200	-39° 45' 6.200"	-23° 44' 7.566"
48	48	200	-39° 42' 12.596"	-23° 23' 24.641"

Figure 4 – Station Locations



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3. PROJECT INFORMATION

The tables below details the project information regarding the personnel involved on operations, survey parameters, and the equipment to be inspected (**Table 1** to **Table 5**).

Table 1 – Operational Team		
Name	Function	Company
Leandro Pickhardt	Surveyor Supervisor	Oceaneering
Gabriel Azzolini	Online Surveyor	Oceaneering
Stefan Reuwsaat	Online Surveyor	Oceaneering
Vitor Elias	ROV Supervisor	Oceaneering
Carlos Henrique Silveira	ROV Supervisor	Oceaneering
Mike Gladson	Captain	Siem Offshore

Table 2 – Geodetic Parameters	
DATUM PARAMETERS	
DATUM	SIRGAS 2000 (ITRF2000 at epoch 2000.40) EPSG Code 6674
ELLIPSOID	GRS 1980 (GRS) EPSG Code 7019
SEMI MAJOR AXIS (a)	6 378 137.000 m
SEMI MINOR AXIS (b)	6 356 752.314 m
ECCENTRICITY SQUARE (e^2)	0.006 694 380 02
INVERSE FLATTENING (1/f)	298.257 222 101
COORDINATE SYSTEM PARAMETERS	
PROJECTION	Universal Transverse Mercator
ZONE	24 South
CENTRAL MERIDIAN	039° West Greenwich
LATITUDE OF ORIGIN	000° Equator
FALSE EASTING	500 000.0 m
FALSE NORTHING	10 000 000.0 m
SCALE FACTOR	0.9996
PROJECTED CRS:	SIRGAS 2000 / UTM Zone 24 S EPSG Code 31984
Table 3 – Survey Instruments	
Operation Mode	SSBL
Depth Gauge	
Model	DIGIQUARTZ 8CB4000

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Time	
Universal Time Coordinate	UTC - 3 Hours
Vertical Datum	
Datum	LMSL
Tide	TPXO Model / Atlantic Ocean

Table 4 – Environmental Conditions			
Date	Wind (kts)	Swell (m)	Surface DP Current (kts)
19-03-2020	13kts @355°	1.5m @ 010°	0.5kts @ 210°

3.1. Sound Velocity Profile

At the beginning of operations, the ROV MILL 048 dived till the seabed at constant speed in order to collect the sound velocity, and its results were updated on the HIPAP USBL system and survey navigation system. The figure below presents the profile during the downcast.

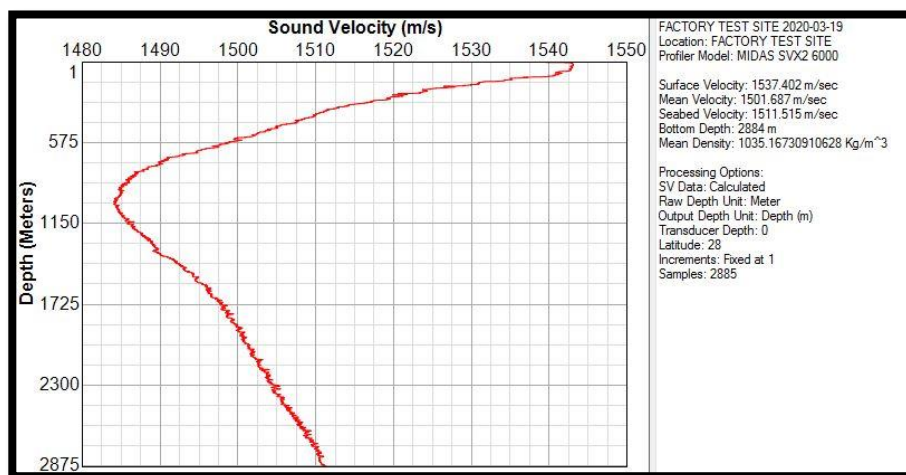




Figure 5 – SVP representation



Table 5 – Sound Velocity Profile			
Date	UTM Coordinates		Mean Sound Velocity (m/s)
	N (m)	E (m)	
19-03-2020	7.406.553,00	406.519,00	1501.69

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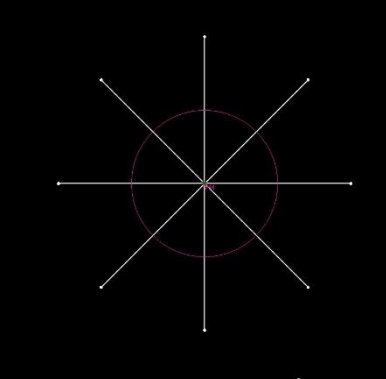
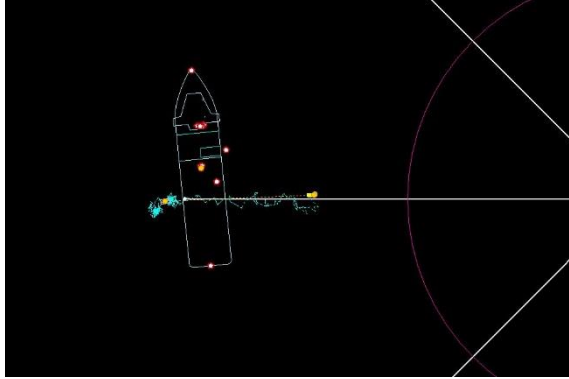
4. OPERATIONAL SEQUENCE

The ROV dived and commenced the inspection of the environmental baselines at Station #44, following sequence:

- EBS Station #44 – EBS Plan View (**Picture 1**);
- EBS at Station #44; from West to East (**Picture 2 to Picture 7**);
- EBS at Station #44; from SE to NW (**Picture 8 to Picture 12**);
- EBS at Station #44; from North to South (**Picture 11 to Picture 17**);
- EBS at Station #44; from SW to NE and center of Location (**Picture 18 to Picture 25**);
- EBS at Station #44; on the circle of 100m radius in a counter clockwise direction. (**Picture 26 to Picture 30**).

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5. PICTURES

	
Picture 1 – Station #44 – EBS Plan View	Picture 2 – W to E Baseline – Start – Plan View
<div> <div>JE E 103 SE </div> <div> CAGE THR: 89.20 DPT: 2363.01 HDG: 85.09 Turns: 0.4 </div> <div> P: -0.40 Turns: 0.4 R: 0.90 </div> <div> UEH DPT: 2895.28 ALT: 2.660 BTY: 2897.94 </div> <div> CP Probe: -0.045 OCEANEERING Millennium 048 </div> <div> E: 406606.58 N: 7406577.06 C-M-541 EBS (#44) </div> <div> DIVE: 319 09:17:42 19.03.20 </div> </div>	<div> <div>NE 088 SE</div> <div> CAGE THR: 89.20 DPT: 2362.83 HDG: 84.89 Turns: 0.4 </div> <div> P: 0.30 Turns: 0.4 R: 1.10 </div> <div> UEH DPT: 2895.54 ALT: 2.330 BTY: 2897.94 </div> <div> CP Probe: -0.024 OCEANEERING Millennium 048 </div> <div> E: 406608.76 N: 7406579.79 C-M-541 EBS (#44) </div> <div> DIVE: 319 09:16:36 19.03.20 </div> </div>
Picture 3 – W to E Baseline – Start – Seabed View	Picture 4 – Marine Life on Seabed
<div> <div>NE E 099 SE </div> <div> CAGE THR: 92.00 DPT: 2363.19 HDG: 98.39 Turns: 0.4 </div> <div> P: -0.20 Turns: 0.4 R: 2.10 </div> <div> UEH DPT: 2895.55 ALT: 2.610 BTY: 2898.16 </div> <div> CP Probe: -0.013 OCEANEERING Millennium 048 </div> <div> E: 406803.76 N: 7406577.80 C-M-541 EBS (#44) </div> <div> DIVE: 319 09:51:04 19.03.20 </div> </div>	<div> <div>NE 083 E SE</div> <div> CAGE THR: 94.40 DPT: 2362.12 HDG: 107.69 Turns: 0.5 </div> <div> P: 0.80 Turns: 0.4 R: 1.50 </div> <div> UEH DPT: 2896.35 ALT: 2.300 BTY: 2898.67 </div> <div> CP Probe: -0.020 OCEANEERING Millennium 048 </div> <div> E: 407013.48 N: 7406579.47 C-M-541 EBS (#44) </div> <div> DIVE: 319 10:33:41 19.03.20 </div> </div>
Picture 5 – Marine Life on Seabed	Picture 6 – W to E Baseline – End – Seabed View

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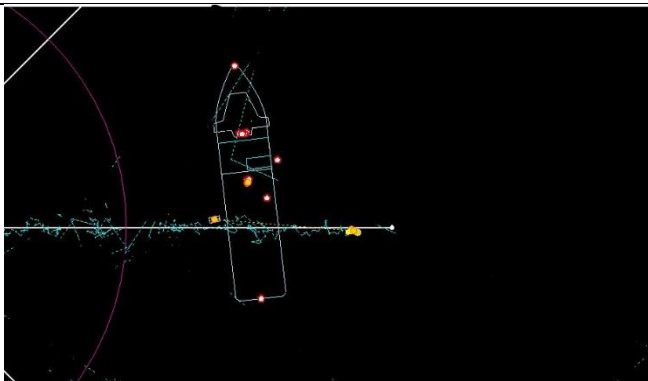
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Picture 7 – W to E Baseline – Finish – Plan View



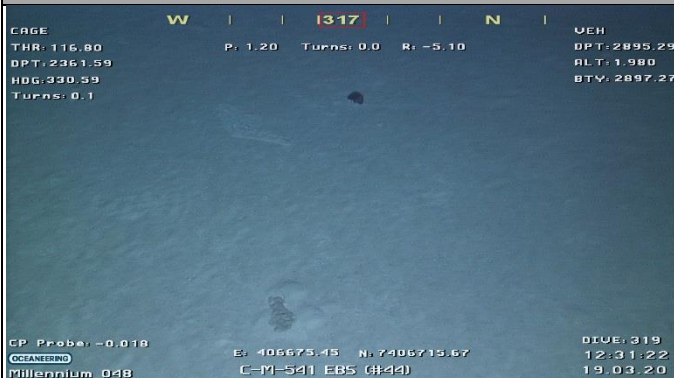
Picture 8 – SE to NW Baseline – Start – Plan View



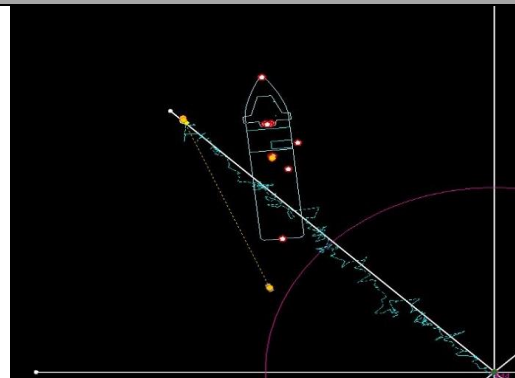
Picture 9 – SE to NW Baseline – Start – Seabed View



Picture 10 – Marine Life on Seabed



Picture 11 – SE to NW Baseline – End – Seabed View



Picture 12 – SE to NW Baseline – Finish – Plan View



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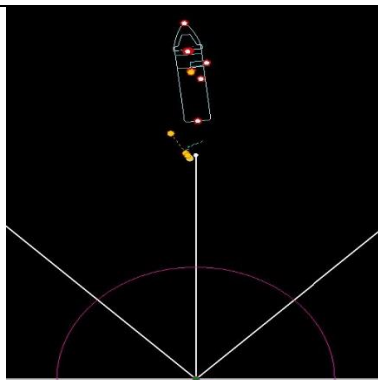
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Picture 13 – N to S Baseline – Start– Plan View



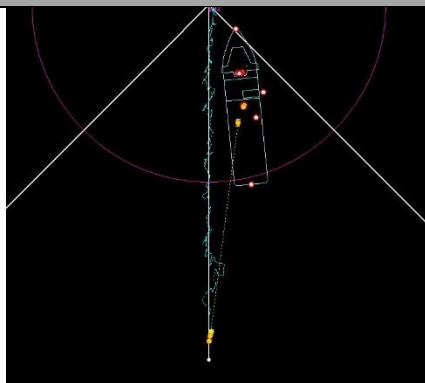
Picture 14 – N to S Baseline – Start – Seabed View



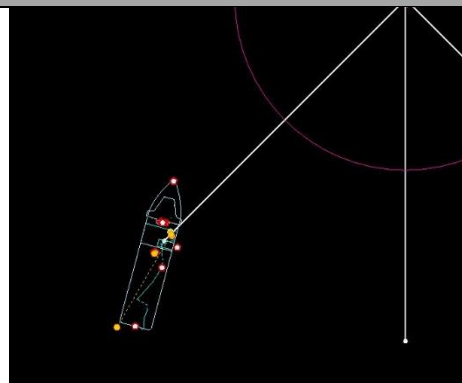
Picture 15 – Marine Life on Seabed



Picture 16 – N to S Baseline – End – Seabed



Picture 17 – N to S Baseline – End – Plan View



Picture 18 – SW to NE Baseline – Start – Plan View



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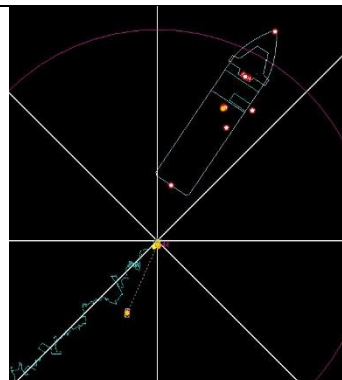
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Picture 19 – SW to NE Baseline – Start – Seabed View



Picture 20 – Center of location #44 – Plan View



Picture 21 – Center of location #44 – Seabed View



Picture 22 – Marine Life on Seabed



Picture 23 – Marine Life on Seabed



Picture 24 – SW to NE Baseline – End – Seabed View

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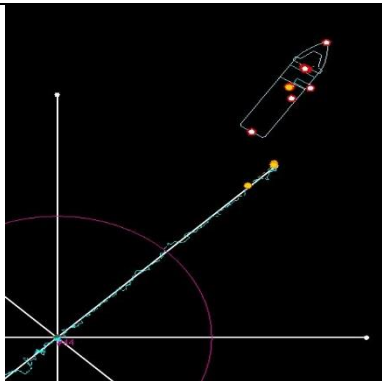
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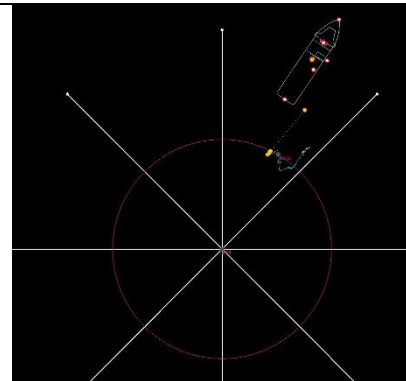
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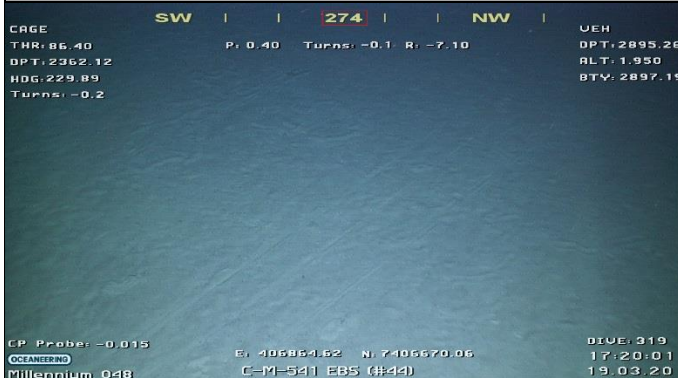
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Picture 25 – SW to NE Baseline – End – Plan View



Picture 26 – Start of inspection on the circle of 100m radius – Direction counter clockwise- Plan View



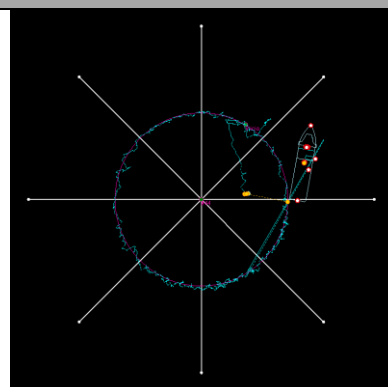
Picture 27 – Start of inspection on the circle of 100m radius - Direction counter clockwise- Seabed





Picture 28 – Marine Life on Seabed



Picture 29 – End of inspection on the circle of 100m radius - Direction counter clockwise - Seabed





Picture 30 – End of inspection on the circle of 100m radius - Direction counter clockwise - Plan View

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6. CONCLUSION

- The EBS operation at Station #44 in the C-M-541 Block was conducted with success and identified some marine life events at the location;

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7. ATTACHMENTS

- 01 HD with the images, videos, report and other files of the operation:
 - Images of Operation (*.jpeg);
 - Videos of Operation (*.mpg);
 - Report (*.pdf);
 - JSEA and RA (*.pdf);
 - SVP files (*.usr, *.000).

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8. ACCEPTANCE

Leandro Pickhardt Survey Supervisor - OSS	Signature	27-03-2020 Date
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No CSR on board Total Representative - CSR	Signature	Date
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We Solve the Unsolvable.