



BLOCK C-M-541



SERVICE REPORT – PSV SIEM GIANT (STATION MAROLO-1)

Client:	Total E&P do Brasil
Client Document Number:	SG-C-M-541-20-137
Oceaneering Document Number:	200392-OII-RPT-137-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/BT	EC	27-03-2020



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REVISION HISTORY:

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C-M-541 BLOCK EBS (Station Marolo-1)	
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.

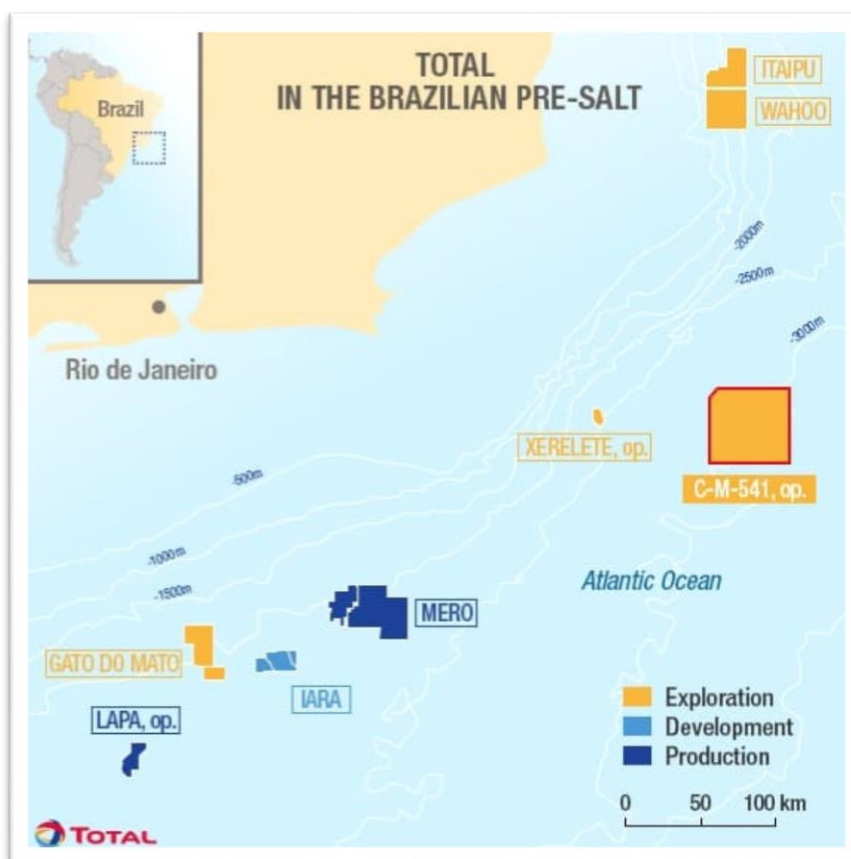




Figure 1 – TOTAL E&P in Brazilian Pre-Salt

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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-41 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.

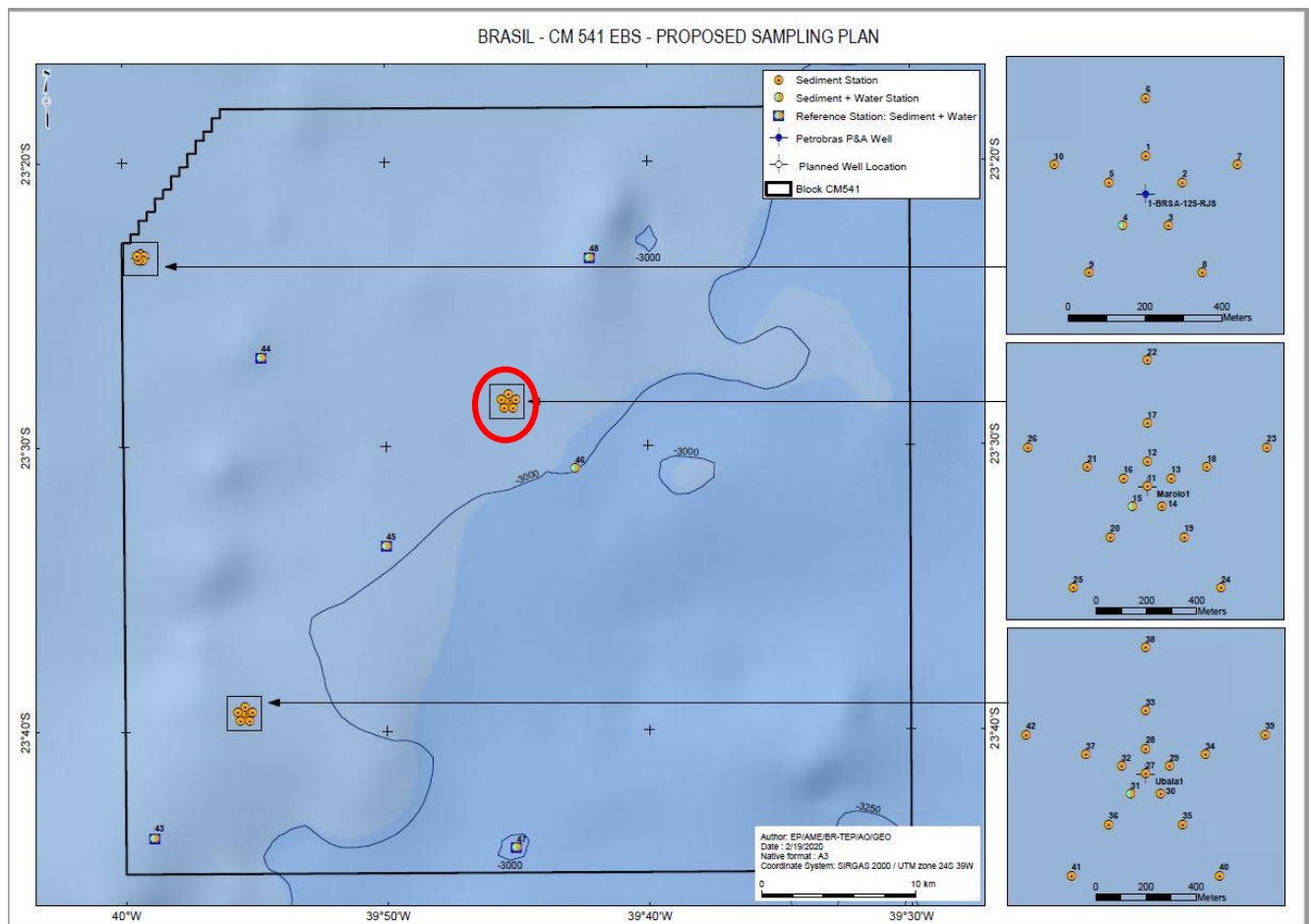




Figure 2 – EBS – Proposal Sampling Plan at Block C-M-541

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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:

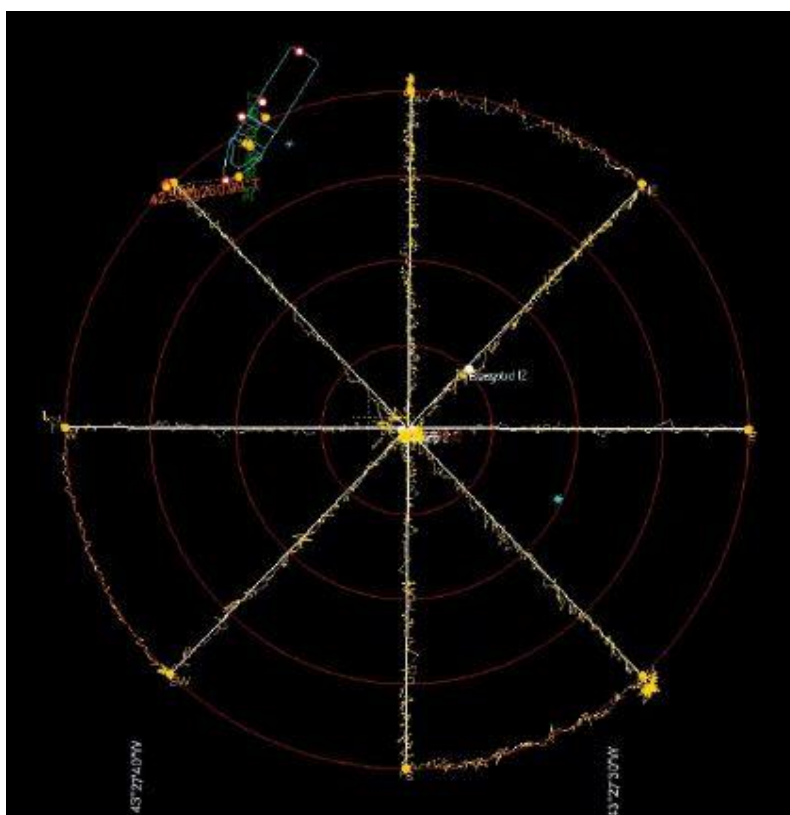




Figure 3 – Example of navigation path during the baseline survey

Instructions were received by client, and proposed coordinates for each survey were indicated on map (Figure 2). This report focuses on Station Marolo-1 only.



Station Marolo-1					
Northing	Easting	Latitude	Longitude	Estimated Depth	As Found Depth
7.403.780,00	422.869,00	23° 28' 27,20" S	039° 45' 19,01" W	2.890	3.000

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All coordinates refer to DATUM SIRGAS 2000 UTM 24S.
Different location have different length of the radial lines.

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' 18.763"	-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 – Table of 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	Senior Surveyor	Oceaneering
Gabriel Azzolini	Online Surveyor	Oceaneering
Stefan Reuwsaat	Online Surveyor	Oceaneering
Vitor Elias	ROV Supervisor	Oceaneering
Carlor 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)
20-03-2020	25kts @354°	2,0m @245°	1,4kts @140°

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.

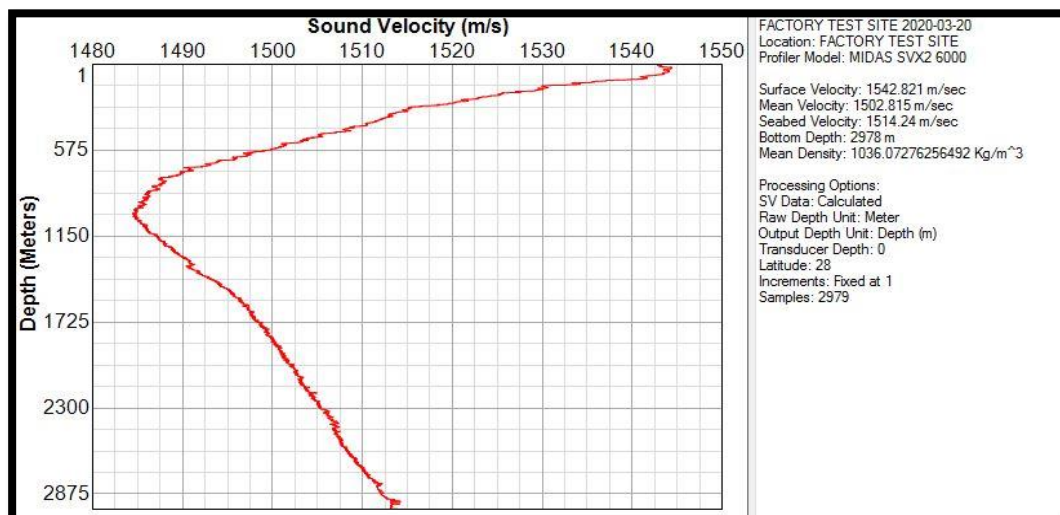




Figure 5 – SVP representation



Table 5 – Sound Velocity Profile			
Date	UTM Coordinates		Mean Sound Velocity (m/s)
	N (m)	E (m)	
20-03-2020	7.404.313,00	422.958,00	1502,8

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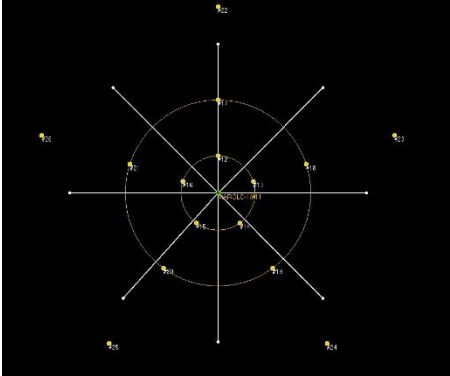
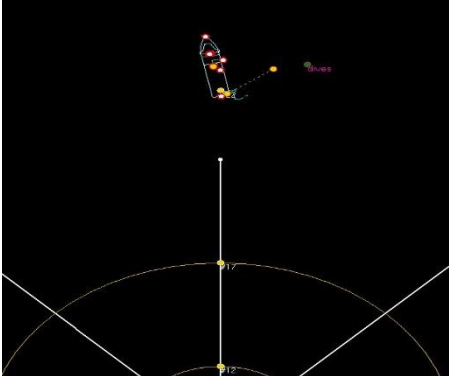
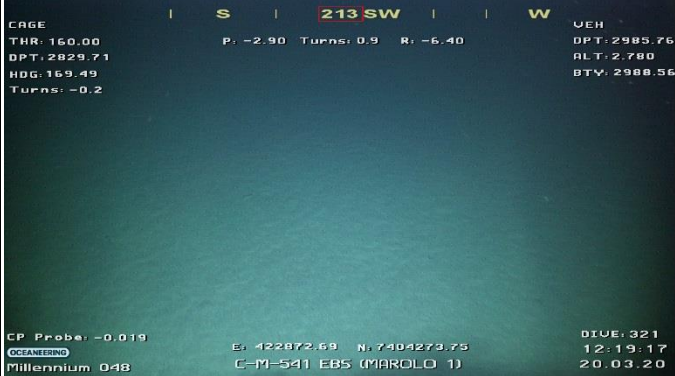
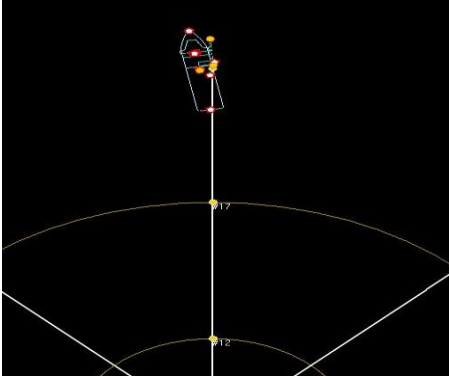
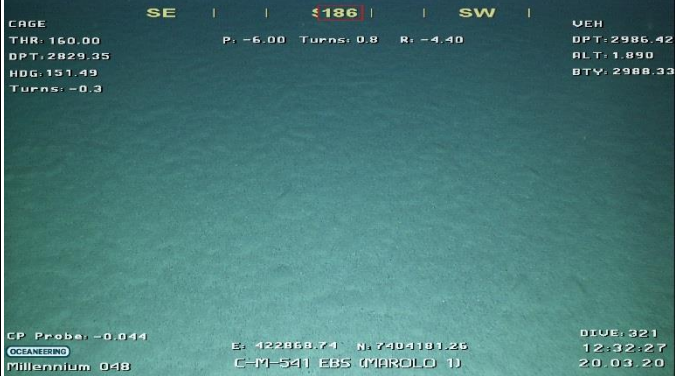
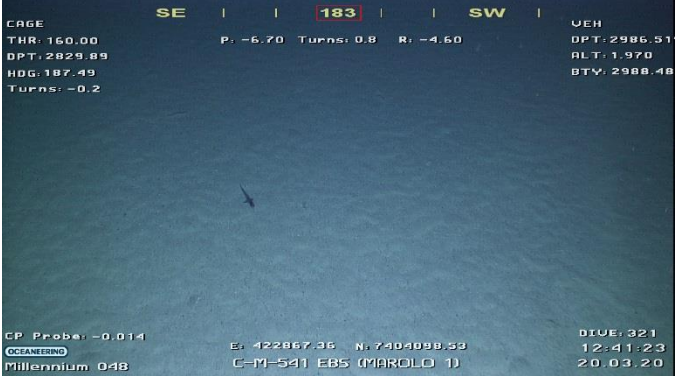
4. OPERATIONAL SEQUENCE

The ROV dived and commenced the inspection of the environmental baselines at Station Marolo-1, following sequence:

- EBS Station Marolo 1 – EBS Plan View **(Picture 1)**;
- EBS at Station Marolo 1 – from North to South and Station #22 **(Picture 2 to Picture 11)**;
- EBS at Station Marolo 1 – from SW to NE and Station #25 **(Picture 12 to Picture 20)**;
- EBS at Station Marolo 1 – from E to W and Station #23 **(Picture 21 to Picture 31)**;
- EBS at Station Marolo 1 – from NW to SE and Stations #26 e #24 **(Picture 32 to Picture 41)**;
- EBS at Station Marolo 1 – on the circle of 250m radius from the center in a counter clockwise direction and Stations #19, #18, #17, #21 and #20. **(Picture 42 to Picture 58)**;
- EBS at Station Marolo 1 – on the circle of 100m radius from the center in a counter clockwise and Stations #14, #13, #12, #16 and #15. **(Picture 59 to Picture 76)**;
- Fixed Positions of the Center of Marolo 1 Station (Station #11) and DQZ measurements. **(Picture 77 and Picture 78)**.

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5. PICTURES

			
Picture 1 – Station Marolo 1 – EBS Plan View		Picture 2 – Station #22 - Plan View	
			
Picture 3 – Station #22- Seabed View		Picture 4 – N to S Baseline – Start – Plan View	
			
Picture 5 – N to S Baseline – Start – Seabed View		Picture 6 – Marine Life on Seabed	



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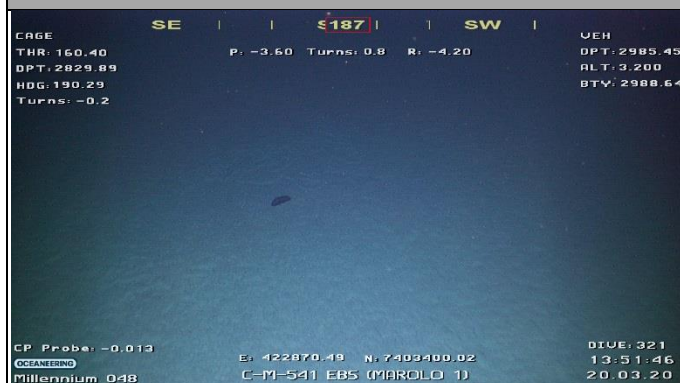
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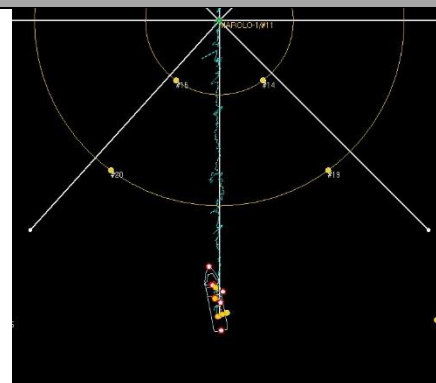
Picture 7 – Marine Life on Seabed



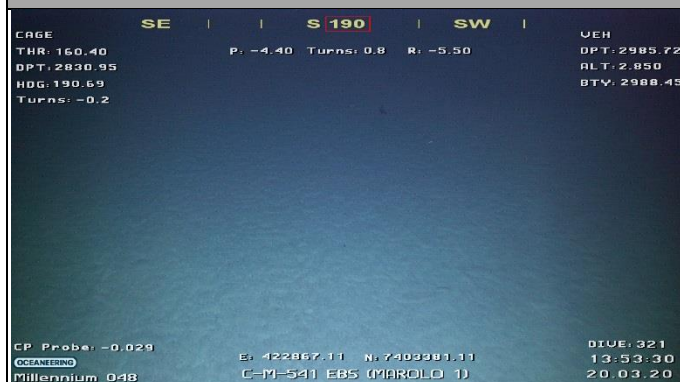
Picture 8 – Marine Life on Seabed



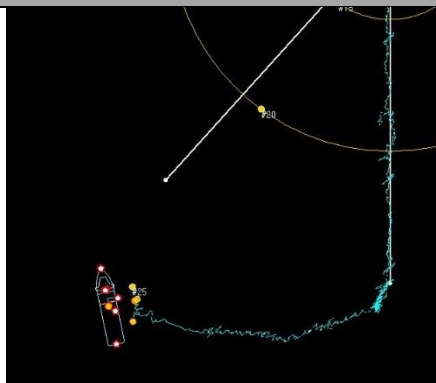
Picture 9 – Marine Life on Seabed





Picture 10 – N to S Baseline – End – Plan View



Picture 11 – N to S Baseline – End – Seabed View



Picture 12 – Station #25 - Plan View

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SERVICE REPORT

BLOCK C-M-541 – EBS - Station Marolo-1

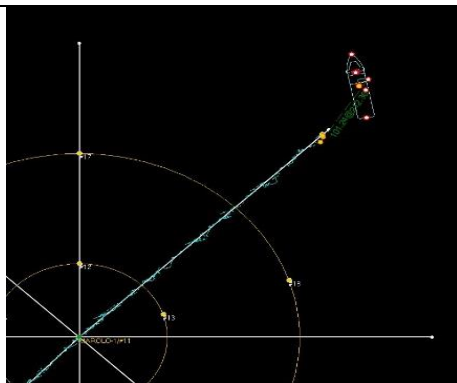
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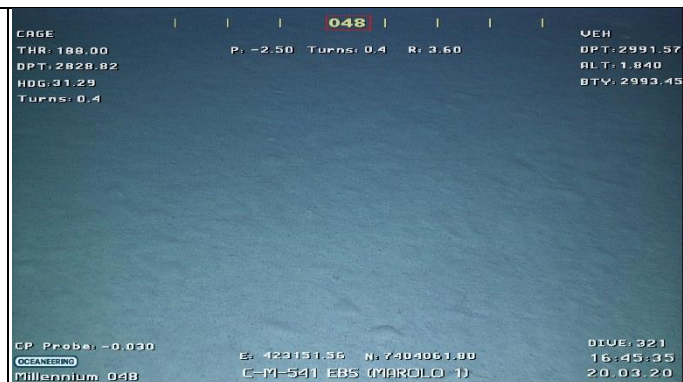
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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

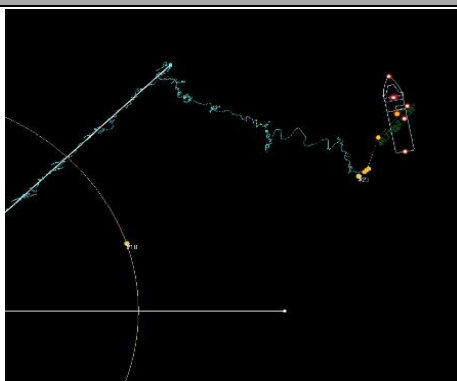
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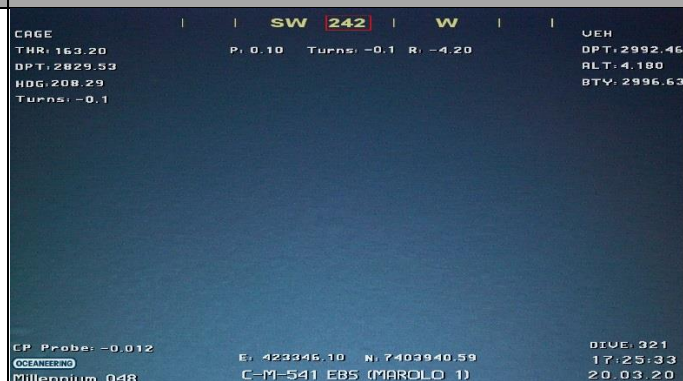
Picture 19 – SW to NE Baseline – END – Plan View



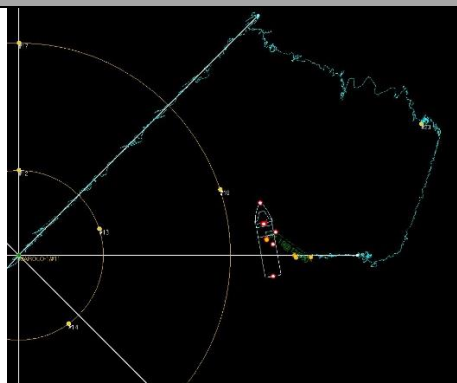
Picture 20 – SW to NE Baseline – END – Seabed View



Picture 21 – Station #23 - Plan View



Picture 22 – Station #23 - Seabed View



Picture 23 – E to W Baseline – Start – Plan View



Picture 24 – E to W Baseline – Start – Seabed View



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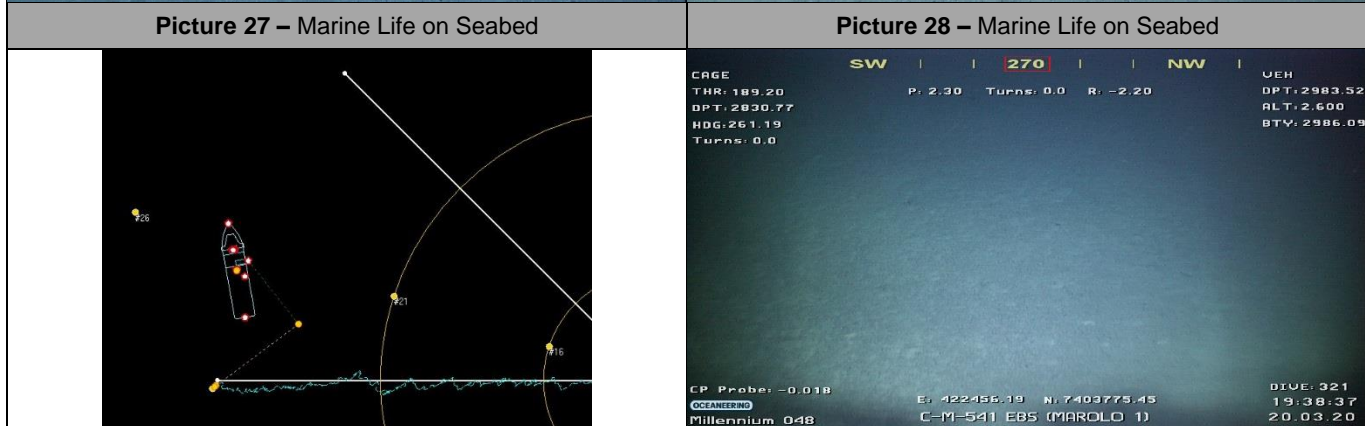
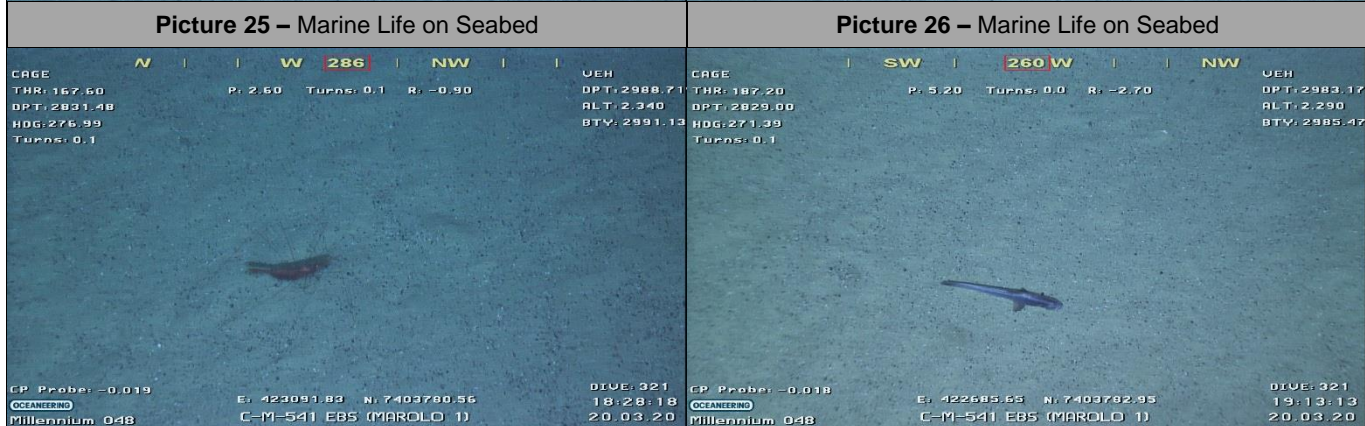
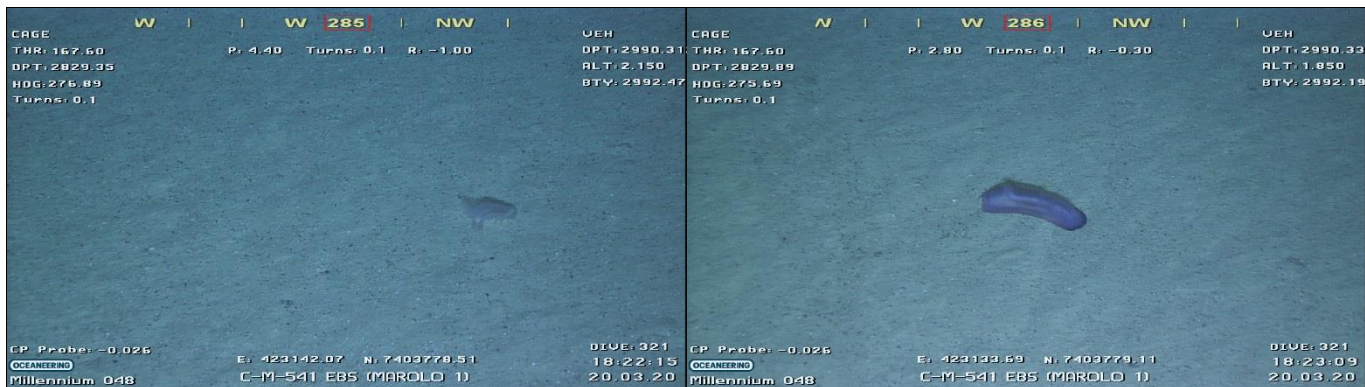
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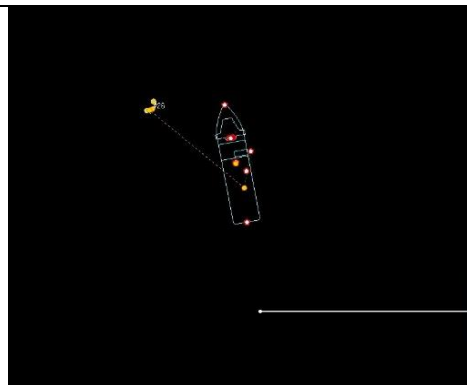
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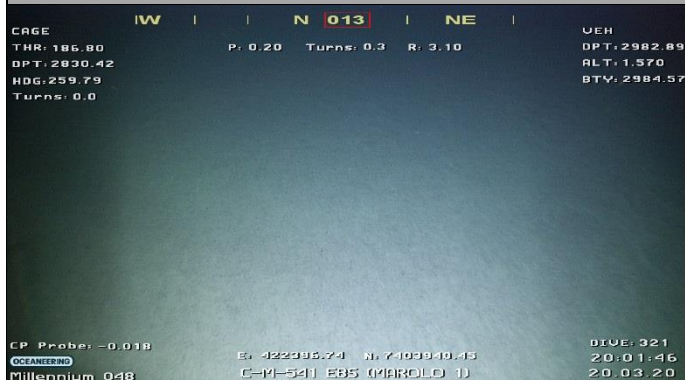
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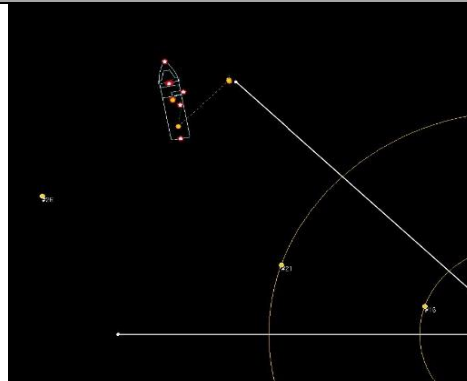
Picture 31 – Marine Life on Seabed



Picture 32 – Station #26 - Plan View



Picture 33 – Station #26 - Seabed View



Picture 34 – NW to SEW Baseline – Start – Plan View



Picture 35 – NW to SEW Baseline – Start – Seabed View



Picture 36 – Marine Life on Seabed



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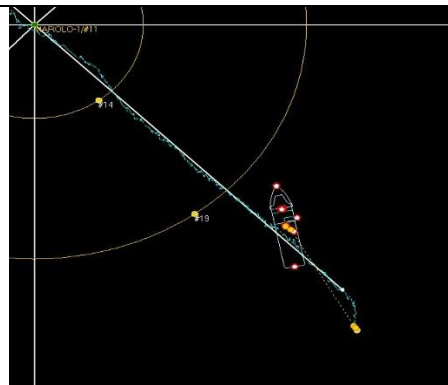
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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

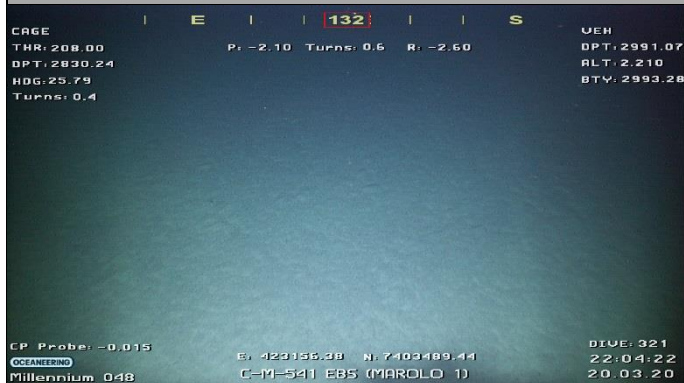
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Picture 37 – Marine Life on Seabed



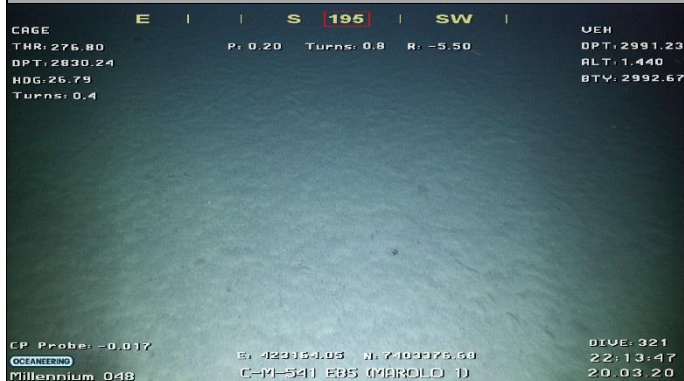
Picture 38 – NW to SE Baseline – End – Plan View



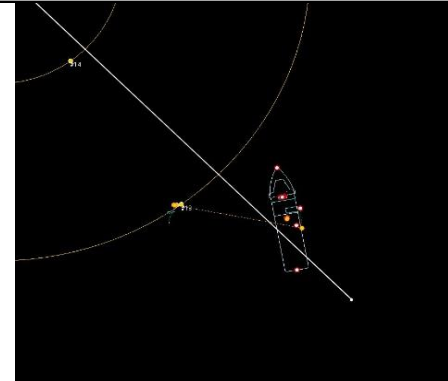
Picture 39 – NW to SE Baseline – End – Seabed View



Picture 40 – Station #24 - Plan View



Picture 41 – Station #24 - Seabed View



Picture 42 – Start of inspection on the circle of 250m radius – Direction counter clockwise – (Station #19) Plan View



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Picture 43 – Start of inspection on the circle of 250m radius – Direction counter clockwise – (Station #19) Seabed View



Picture 44 – Marine Life on Seabed



Picture 45 – Station #18 - Plan View



Picture 46 – Station #18 - Seabed View



Picture 47 – Marine Life on Seabed



Picture 48 – Marine Life on Seabed



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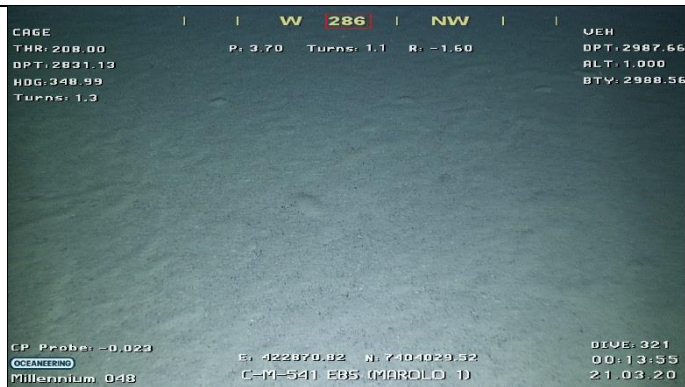
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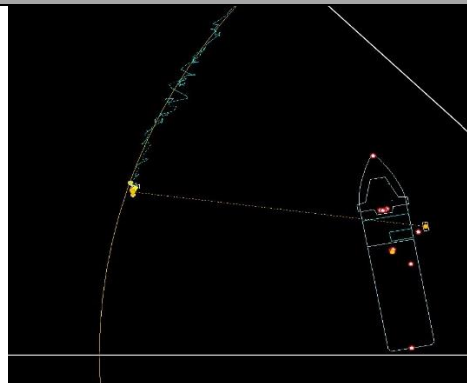
Picture 49 – Station #17 – Plan View



Picture 50 – Station #17 - Seabed View



Picture 51 – Marine Life on Seabed



Picture 52 – Station #17 - Plan View



Picture 53 – Station #17 - Seabed View



Picture 54 – Marine Life on Seabed

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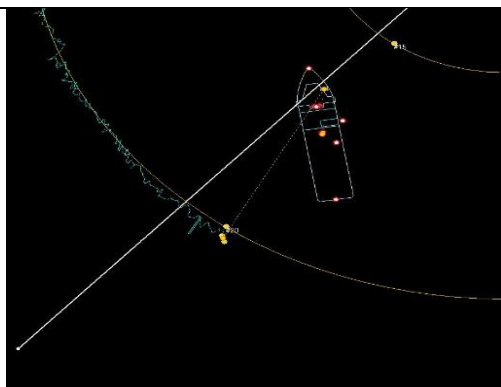
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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

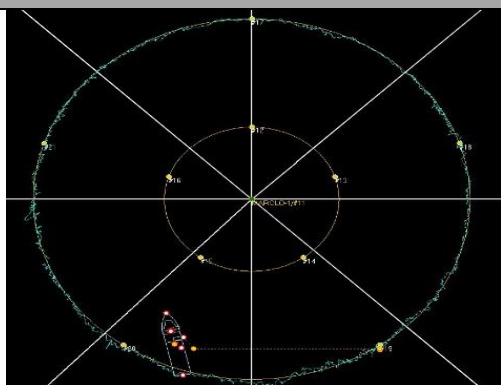
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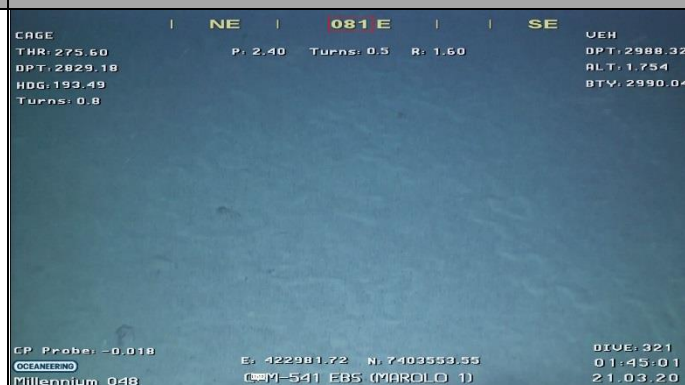
Picture 55 – Station #20 - Plan View



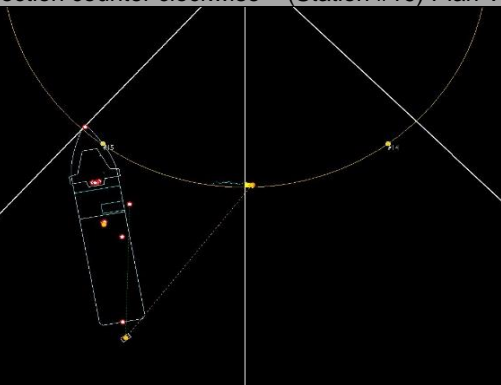
Picture 56 – Station #20 – Seabed View



Picture 57 – End of inspection on the circle of 250m radius – Direction counter clockwise – (Station #19) Plan View



Picture 58 – End of inspection on the circle of 250m radius – Direction counter clockwise – (Station #19) Seabed View



Picture 59 – Start of inspection on the circle of 100m radius – Direction counter clockwise – Plan View



Picture 60 – Start of inspection on the circle of 100m radius – Direction counter clockwise – Seabed View



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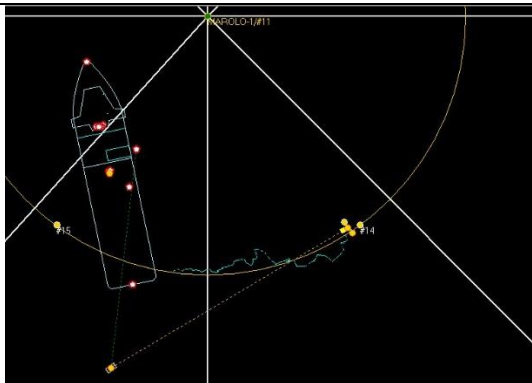
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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

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Picture 61 – Station #14 - Plan View



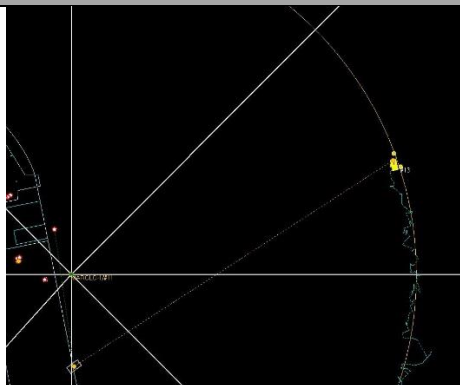
Picture 62 – Station #14 - Seabed View



Picture 63 – Marine Life on Seabed



Picture 64 – Marine Life on Seabed



Picture 65 – Station #13 - Plan View



Picture 66 – Station #13 - Plan View



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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

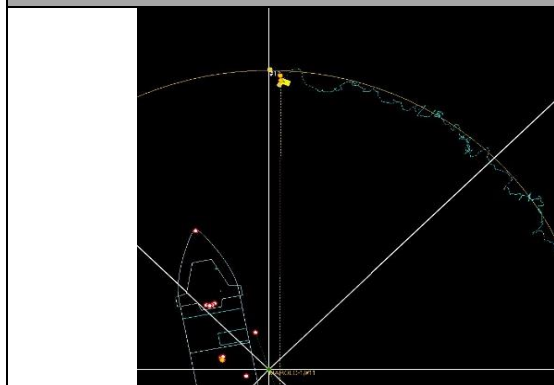
ATTACHMENTS:01



Picture 67 – Marine Life on Seabed



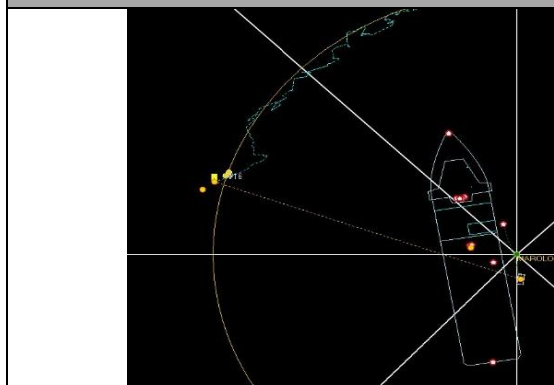
Picture 68 – Marine Life on Seabed



Picture 69 – Station #12 - Plan View



Picture 70 – Station #12 - Seabed View



Picture 71 – Station #16 - Plan View



Picture 72 – Station #16 - Seabed View

SERVICE REPORT

BLOCK C-M-541 – EBS - Station Marolo-1

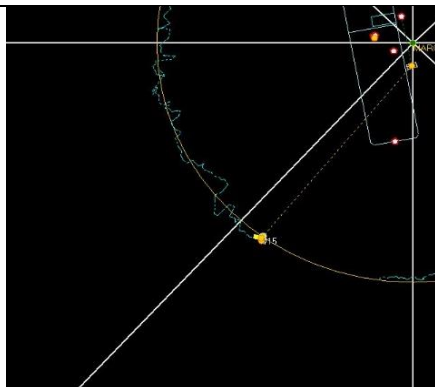
DATE:
27-03-2020

PSV Siem Giant

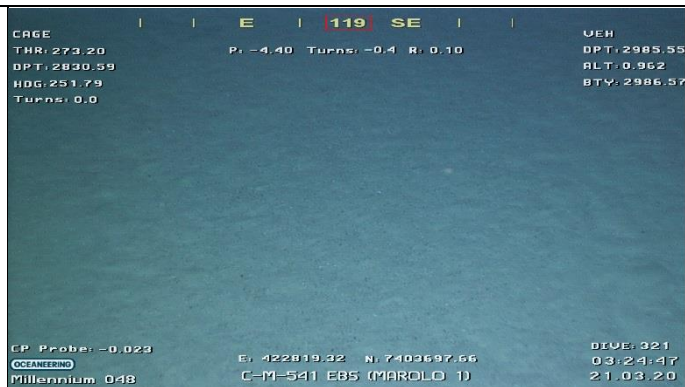
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MARINE PRODUCTION SYSTEMS DO BRASIL – AT SERVICE OF TOTAL E&P DO BRASIL LTDA.

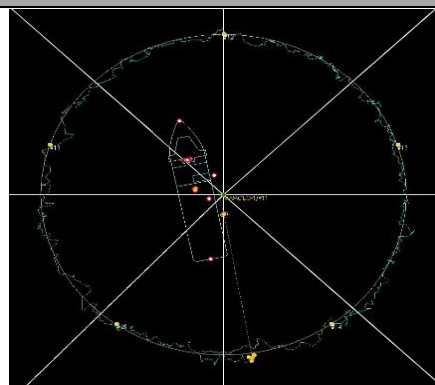
ATTACHMENTS:01



Picture 73 – Station #15 - Plan View



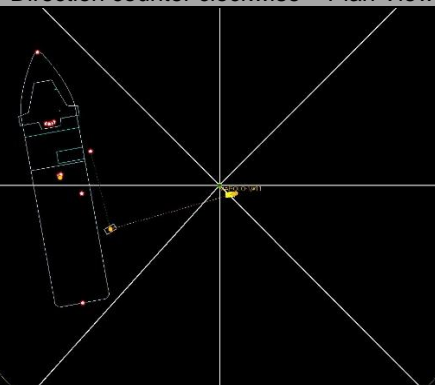
Picture 74 – Station #15 - Seabed View



Picture 75 – End of inspection on the circle of 100m radius – Direction counter clockwise – Plan View





Picture 76 – End of inspection on the circle of 100m radius – Direction counter clockwise – Seabed View



Picture 77 – Center of Marolo 1 Station (Station #11) – Plan View





Picture 78 – Center of Marolo 1 Station (Station #11) – Seabed View (End of EBS Marolo 1 Station)

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6. CONCLUSION

- The EBS operation at Station Marolo-1 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.