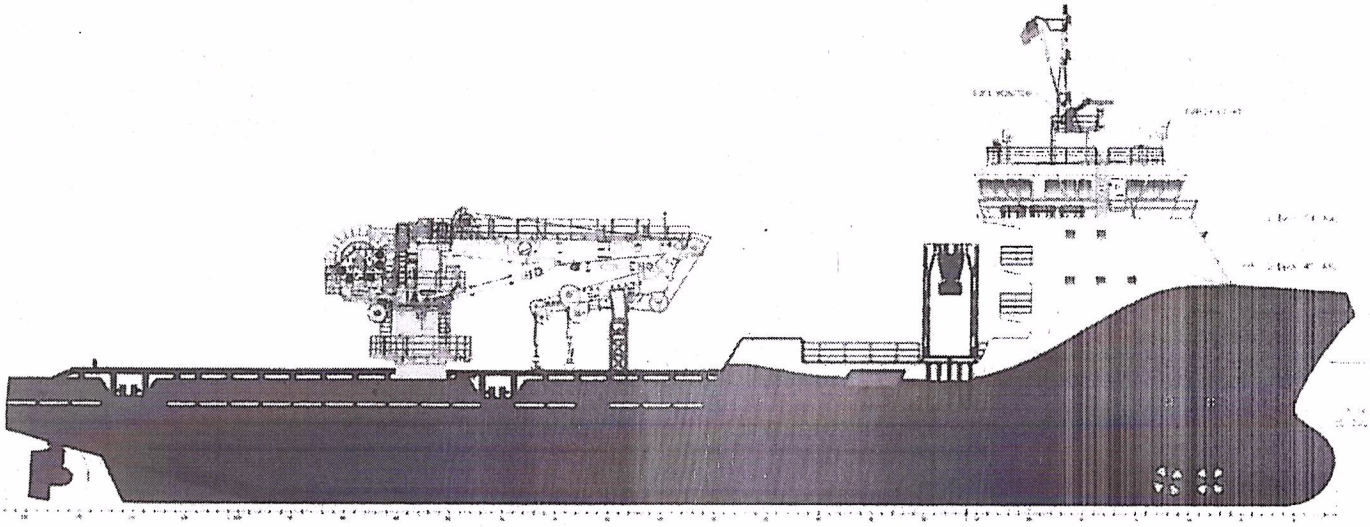
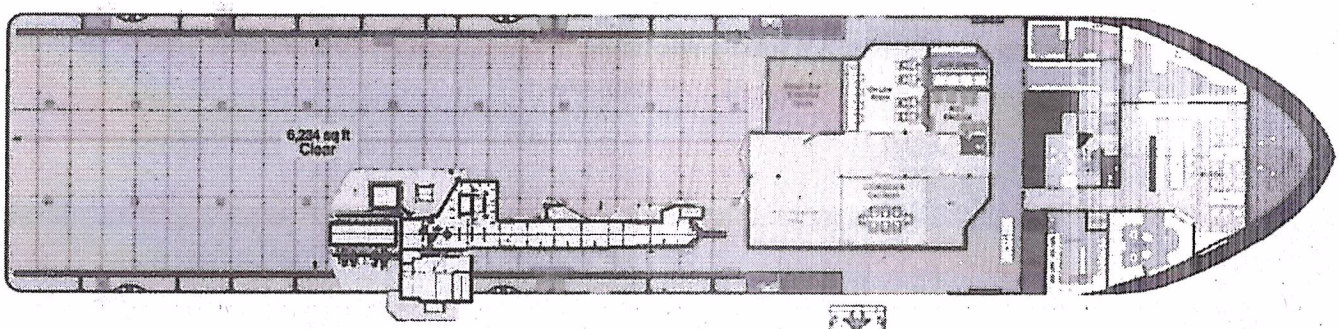
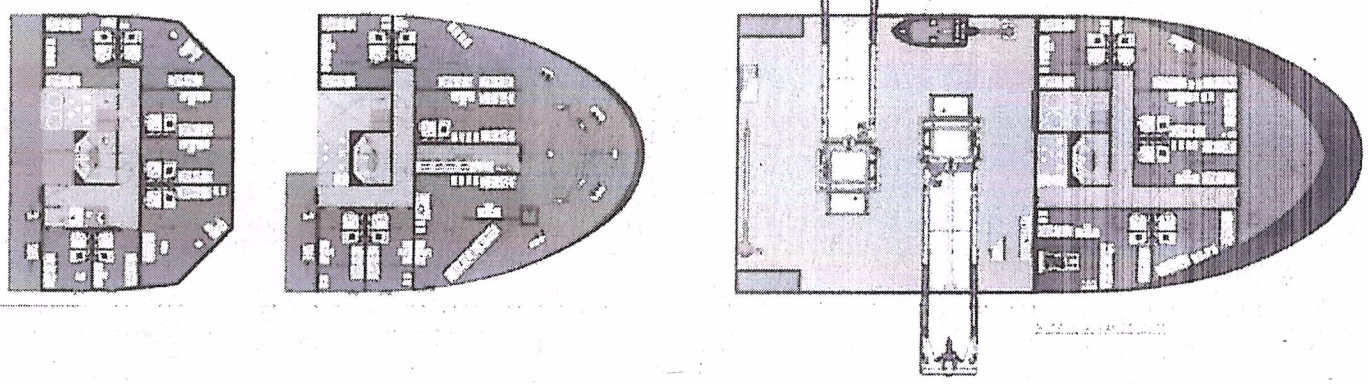
MV SHELIA BORDELON

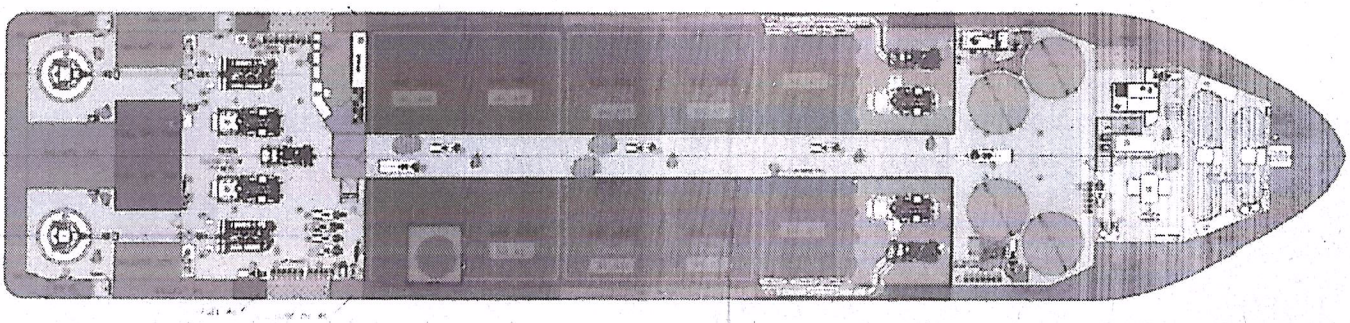
STINGRAY 260 CLASS DP2

EMBARCACION ESPECIALISTA PARA TRABAJOS CON RO



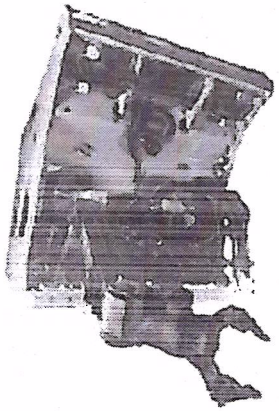






Schilling 150 HD
ROV

Clase de Trabajo de ROV	Vans
Schilling HD 150 HP 3,000 Metros	DNV Certificación de Área de Seguridad
Cámara y luces	**Sensores**
HD Color Zoom - Insite mini Zeus	Sensor de Profundidad Paro-científico Digiquartz CCD
Color Zoom - Insite Pegasus	CDL TOGS/Nav Cabezal de Giroscopio Paso de Rollo
Color CCD Foco Fijo - Insite Aurora	Cabezal CDL InSense /Paso/Rollo/Sensor de Prof
Luz Baja Blanco y Negro - Insite Mercury	RDI Caballos de Fuerza 1200 kHz DVL
Cámara de Muñeca manipulador T4	Altímetro Kongsberg (MS 1007)
2 x Panorámico e inclinaciones	Sonar Kongsberg 1171 con Cabezal MS1000
Luces - ROS LED Flood 4 each	Flasher Novatech ST400AR Xenon
Luces - ROS LED Spot 6 each	Radiogoniómetro Novatech, ProFIND NT DF
Manipulador	**Sistema de Gestión de Sujeción**
Atlas Tasa7F	Top Hat
Cámara de muñeca Titán 4 c/w	**Umbilical de 850 Metros**
Cabrestante	Color CCD Foco Fijo 2 cada uno
DNV Certificación	Spots ROS LED 2 cada uno



SEA	TECHNICAL DATA SHEET	Nr: TDS001_TECHNICAL DATA SHEET	Rev	0
	TITLE: THE L.A.R.S SYSTEM		SHEET: 1 of 6	

REVISION INDEX

REV.	DESCRIPTION AND / OR REVISED SHEETS
0	Issued for internal purpose

	REV. 0	REV. A	REV. B	REV. C	REV. D
DATE	13/09/2017				
EXECUTE	SC				
CHECKED	GB				
APROVED	FB				

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Figure 1: L.A.R.S. system

The components dimension and weights are defined in the table below:

Item	Quantity (n°)	Single weight (kgs) approx	Total weight (kgs) approx
Basement	2	745	1490
Arms	2	1720	3440
Tubular pipe	1	525	525
Piston	2	825	1650
Plate	2	390	780
clamps	4	17	68
Winch	1	2052	2052
Total weight (kg)			**10.005**

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2 PTM DEPLOYMENT AND RECOVERY

2.1 PTM Deployment

The TSV will be positioned near the pipeline, with the bow towards up current.

The vessel will be positioned in a way that the axis of the lifting which of the L.A.R.S system, is approximately 5 metres from the pipeline, meaning that the launching of the PTM doesn't expose the pipeline to any risks.
The PTM, always secured on-board before launching and after recovering operations, will be prepared for the launching.

Prior to the PTM launching, a full briefing to all support personnel (PTM/L.A.R.S system Operator, Sonar Operator) will have taken place, in order to ensure all involved personnel are fully instructed and aware of the requirements for the actions to be performed during the operations.

The PTM positioning will be supported by a sonar, installed on the PTM, which will assist the minor adjustments of the machine, to perfectly align it to the pipe, and it will not only confirm that the machine is in the correct position.

Figure 2:PTM deployment

The sequence of events will be as follows:

- A full functional test of all systems will be carried out on the machine as per pre-start check list: once all tests have been successful, the PTM is ready to be positioned;
- The trenching start point will be identified by the positioning system of the TSV;
- The PTM will be launched approx. 5 metres from the pipeline with the L.A.R.S system on board of the TSV;
- The PTM then begins its descent below the surficial water level;
- Air is given to the buoyancy tank;
- Once the sonar confirms that the PTM, has been lowered towards approx. 3 m above the pipeline, the Sonar Operator will instruct the PTM/L.A.R.S. system operator to move the

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PTM and the TSV over the pipeline in order to reach the correct position of the PTM on the pipe;

- The orientation of the PTM remains unchanged, keeping an asset that is inclined in a position where the rear is lower than the front side; this asset, kept by means of the lifting rope, allows the rear driving wheels to touch the pipeline before the front wheels.
- In the event that the machine is not perfectly aligned on the pipeline, the PTM operator will support the correct alignment positioning using the sonar;
- Upon confirmation that the PTM is correctly aligned and installed on the pipe (sonar confirming that the driving wheels are touching the pipeline), the guiding ropes will be unhooked and recovered onboard. The PTM will remain connected to the L.A.R.S. system, by means of the lifting rope, and to the TSV by mean of the umbilical;
- The trenching operations will start.

Note: The Sonar Technician involved in the trencher positioning, will be appropriately instructed and trained on the actions to be performed for a correct PTM positioning and to be able to operate safely and avoid any kind of risk during operations.

Check-lists

Before the PTM launching, the PTM/L.A.R.S. Operator will follow a checklist to control that the equipment is in perfect condition always, and to avoid any possible risky situations.

2.2 PTM Recovery

The procedure to recover the PTM on board of the TSV is simple (efficiency is indispensable especially in case of emergency):

- The PTM advancement will be stopped;
- The extraction pumps will be lifted from the working position;
- The cutting wheels will be lifted from the working position and their rotation will be slowed down;
- Once the cutting wheels reach the maximum lifting point, they will be turned off;
- The vessel will be positioned in a way that ensures that the L.A.R.S system's lifting rope supporting the PTM is in a perfect vertical line above the machine;
- The PTM will be lifted to approximately 3 m from the seabed and the Sonar Operator will confirm when this position has been reached;
- The TSV will then be moved laterally to the pipeline route by approximately 5 metres in order to distance the L.A.R.S. System from the pipeline to avoid risks during the recovery operations;
- Once the sonar Operator has given authorisation, the L.A.R.S system operator will continue the PTM recovery onboard, up to position it on the basement installed on the TSV deck.

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- - En la Ciudad de México, a nueve de marzo de dos mil dieciocho.- -

- - **PEDRO JOSÉ CANSECO MALLOY**, Corredor Público número veinticinco en ejercicio en la Ciudad de México, **CERTIFICO**: -

- - Que la presente es copia fiel de su original que tuve a la vista y misma que quedó relacionada en el **ACTA número dieciocho mil ciento setenta y tres,** que se expide con fundamento en lo dispuesto por el artículo sexto fracción VII (siete romano) de la Ley Federal de Correduría Pública, a solicitud de Inteligencia Marítima, Sociedad de Responsabilidad Limitada de Capital Variable, para los usos a que haya lugar en Derecho.- -

- - VA EN **SIETE** PÁGINAS ÚTILES, SELLADAS Y RUBRICADAS. **DOY FE.**- -

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SEA

QUALITY CERTIFICATE

Name of Equipment: LEO2 PTM

Type of Equipment: Pipeline Post-Trenching Machine

Client: DREBBEL S.A.P.I. de C.V.

Project Ref.: 1706 Drebbel Lineas 94 Gulf of Mexico

Quality Certification

This certificate testifies that LEO2 PTM was designed and constructed in compliance with Quality Parameters required by the International Manufacturing Standards.

We also confirm that, after having assessed its technical specifications, the equipment is perfectly suitable for the execution of medium diameter pipeline trenching works for the Lineas 94Project:

PTM Main Components:

Components	Quantity
Main Frame:	1
Extraction Pumps:	2
Cutting Wheels:	2+2+2
Jetting Pump:	1
Ballast Tank	1

SEA

Maintenance (in compliance with SEA's Quality Manual)

Overall maintenance: at the beginning of each project

Periodical: annual

Date of issue of certificate	*Expiry date of certificate*
April 05th, 2017	April 05th, 2018

TECHNICAL DIRECTOR	**Q H.S.E. &**
The Inventor	**PROJECT MANAGER**
FRANCO BALLESTRI	GUIDO BALLESTRI

- - En la Ciudad de México, a nueve de marzo de dos mil dieciocho.- - - - - - -
- -

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- -

- - VA EN **TRES** PÁGINAS ÚTILES, SELLADAS Y RUBRICADAS. **DOY FE.**- -

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