

Vessel Specification

Deep Explorer

Document number – MOS-OPS-689



This document has been electronically reviewed and approved within the T-MOS BMS Management System (Agility) software, by all parties named below.

Rev.	Date	Description	Written by	Checked by	Approved by	Approved by
6	09-Aug-2019	For implementation	S. Thomson	n/a	n/a	S. Thomson
5	19-Mar-2019	For Implementation	S.Thomson	Deep Explorer Chief Officer	Deep Explorer Captain	R. Gordon

Document revision history

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Disclaimer

The specifications and drawings given here were correct at the time of issue, however the vessels are modified to meet the precise needs of specific projects, and the enclosed data may not represent the specification of the vessel at the time of contract execution.

Therefore this data is included for general information only, and should not form part of a binding agreement between TechnipFMC and any third party without the express agreement of the asset manager.

Clients must be made aware of this whenever they are provided with any vessel data.

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1 Document overview

1.1 Document owner

Asset manager.

1.2 Document criticality

Criticality	Description
Normal	Other documents which do not require frequent reviews

1.3 Revision request

Revision requests or document enquiries should be sent to Helpdesk-TMOS@technip.com or use the feedback button on T-MOS BMS.

1.4 Abbreviations and acronyms

Abbreviation	Explanation
DP	Dynamic Positioning
DSV	Dive Support Vessel
ROV	Remotely Operated Vehicle
DNV	Det Norske Veritas
IMO	International Maritime Organisation
MGO	Marine Gas Oil
IFO	Intermediate Fuel Oil
AHC	Active Heave Compensation
SWL	Safe Working Load
VLS	Vertical Lay System
NMD	Norwegian Maritime Directorate
CT	Constant Tension
PS	Port Side
SS	Starboard Side
OCM	Offshore Construction Manager
T-MOS	TechnipFMC-Management Offshore Services
MPI	Magnetic Particle Inspection
SOLAS	Safety of Lives at Sea
HLB	Hyperbaric Lifeboat
ECR	Engine Control Room
LARS	Launch and Recovery System
SDC	Submersible Decompression Chamber
HCU	Hydraulic Control Unit
IT	Internet Technologies
VHF	Very High Frequency
UHF	Ultra-High Frequency
GMDSS	Global Maritime Distress and Safety Service
HSE	Health and Safety Executive
DECT	Digitally Enhanced Cordless Telecommunications
DSC	Digital Selective Calling
CCTV	Closed Circuit Television
IPTV	Internal Personnel Television
PC	Personal Computer
SPS	Special Purpose Ships
EEBD	Emergency Escape Breathing Device
MHRRF	Mobile Hyperbaric Remote Reception Facility

1.5 Associated and reference documentation

Document no.	Document title
MOS-COM-001	Internal Agreement for The Provision of Vessels to Projects

1.6 Service Level Agreements (SLAs)

See document MOS-COM-001 Internal Agreement for the Provision of Vessels to Projects.

2 General description

2.1 Introduction

Deep Explorer is a DP3 class DSV, purpose-designed and certified for subsea projects in the demanding North Sea Canada market. She is a modern and versatile DSV, thanks to her latest technology diving control system, 400 Te box boom crane, large deck area, working moonpool and work-class ROVs. Deep Explorer is capable of working globally on diving and subsea construction projects, in extreme weather conditions.

2.2 Vessel Data

Vessel MDM number	033326A004
Registered owner	TechnipFMC
Asset manager	Richard Gordon
Builder	VARD
Keel laying date	01.09.2014
Delivery year	2016
Type of vessel	Dive Support and Heavy Construction
Port of registration	Nassau
Flag	Bahamas
DNV class	DNV ✕1A1, E0, DYNPOS-AUTRO (IMO DP III), DK(+), HELIDK-SH (CAA-N), ICE-C, CLEAN DESIGN, NAUT-AW, Comf-V(3) C(3), SPS, BIS, WINTERIZED BASIC, BWM-T, LR ✕100A ASE Saturation Diving System classified by Lloyds Register
DP capability	DP 3
DNV id/hull no.	D34142
IMO number	9729726
SPS certified	Yes

Table 1: Vessel Data

2.3 Principle Dimensions

Description	Quantity	Unit
Length overall	156.7	Metres (m)
Length between perpendiculars	144	
Breadth moulded	27.0	
Depth to main deck moulded	12.0	
Scantling draught moulded	8.5	
Summer load waterline	8.5	
Design draft moulded	7	
Lightship	11,000	Tonnes
Displacement at summer draft	22,921	Tonnes

Description	Quantity	Unit
Deadweight at summer draft	11,500	Tonnes
Gross registered tonnage	19,290	Tonnes
Net registered tonnage	5,806	Tonnes
Total theoretical free deck area	1680	m ²

Table 2: Principle Dimensions

2.4 Payload

Description	Quantity	Unit
Maximum transit speed at design draft 8.5 m (including 10% weather margin)	16.0	Knots
Maximum transit speed at reduced draft (including 10% weather margin)	13.0	Knots
Economy transit speed (50% propulsion power)	11.0	Knots
Total installed normal generator power	22	MW
Emergency generator power	368	KW
Dive emergency generator power	890	KW
Maximum high speed transit power (3 azipods in use)	17.0	Knots

Table 3: Payload

2.5 Vessel Access

Description	Manufacturer	SWL	Location
12m Revolving Gangway c/w One Central Lifting Point Type GS 2039	Gurskøy	900 kgs	Port side
12m Revolving Gangway c/w One Central Lifting Point Type GS 2039	Gurskøy	900 kgs	Starboard side
10m Aluminium Portable Gangway Type 50 degrees	SALA	1500 kg or 20 person	Portable

Table 4: Vessel Access

3 Capabilities

3.1 Capacities

Description	Quantity	Unit
Marine gas oil	2396	m ³
Lube oil reserves	94	m ³
Hydraulic oil reserves	64	m ³
Potable fresh water	1314	TOTAL FW
Technical fresh water		
Ballast	9125	m ³
Main deck	1680	m ²
Main deck loading	7000 @ 15 Te/m ²	Te
Sludge tanks	20.8	Te
Dirty oil tanks	23.5	Te

Table 5: Capacities

3.2 Fuel Consumption and Endurance

Description	Best speed through the water	Fuel consumption per day MGO	Generators on line / total electrical load	Max endurance / range on MGO
Max transit speed	16 kts	65.0 m ³ /day	4	36 days / 14,150 NM
Service transit speed (70 % each azipod)	13 kts	41.7 m ³ /day	3	57 days / 17,926 NM
Fuel efficient transit speed	11 kts	35.7 m ³ /day		67 days / 17,718 NM
DP operations	N/A	22.0 m ³ /day		N/A
In port, divers in SAT or Crane Ops.	N/A	11.0 m ³ /day		N/A
In port, no divers, no Crane Ops	N/A	9.0 m ³ /day		N/A

Table 6: Fuel Consumption and Endurance

4 Propulsion

4.1 Motors

	Make	Type	Power	Key
3x Main Azimuth Thruster Electric Motors	Rolls Royce	Variable pitch	3250kW	FGen 1 FGen 2 FGen 3
2x Retractable Azimuth Thruster Electric Motors	Rolls Royce	Fixed pitch	2200kW	FGen 4 FGen 6
2x Tunnel Thruster Electric Motors	Rolls Royce	Variable pitch	2400kW	FGen 5 FGen 7

Table 7: Propulsion - Motors

4.2 Propellers and thrusters

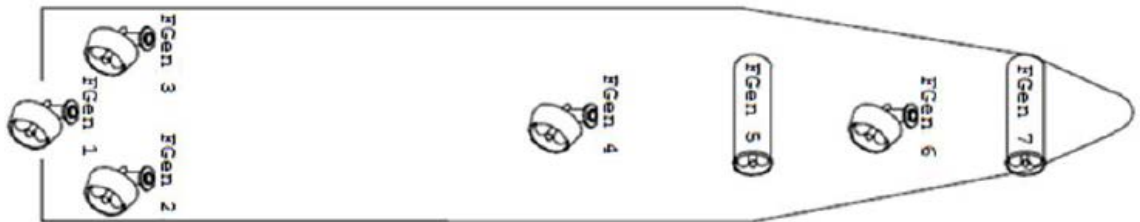


Figure 1: Propellers and Thrusters

5 Power Generation

Main electrical power generation:

- 6.6kV, 3 phase, 60Hz

The following engines and alternators generate the vessel main power:

	Make	Type	Power	Electrical output
4 x Diesel Generators – 2 in each engine room	Wärtsilä	6L32	3170 kW	6.6 kV
2 x Diesel Generators – 1 in each engine room	Wärtsilä	8L32	4220 kW	
4 x Alternator – 2 in each engine room	Siemens	1DC1233-8AL05-Z		
2 x Alternator – 1 in each engine room	Siemens	1DC1244-8AL05-Z		

Table 8: Power Generation

5.1 Emergency Generator

Emergency power is supplied by 1 off 368kW. Nogva Scania DI 13 75M (rad) for the vessel and 1 off 890kW Cummins auxiliary engine type KTA 38D(M1) for the dive system located on bridge roof and main deck respectively.

6 Deck Equipment

6.1 Cargo Hold

No space in Cargo Hold available for Project Teams to utilize. This is due to rule that hatches cannot be opened at sea.

6.2 Lifting Equipment

The vessel is equipped with the following cranes:

- 1 x 400 tonne NOV OC4500BSCE heave compensated box boom crane
- 1 x 58 tonne NOV OC3426KSCE heave compensated knuckle boom crane
- 2 x 10 tonne Seaonics knuckle boom offshore cranes.
- 1 x 3 tonne knuckle boom provisions crane.

For detailed crane information please refer to the Crane Information Section on Vessel Portal Page.

For current wire rope lengths, please liaise with Asset Manager / Operations Engineer.

6.2.1 400Te Crane

Category	Description
Class	DNV
Type	National Oilwell Hydralift 400 tonne OC4500BSCE-(160-400) - (35-13)(40-46) AHC heave compensated box boom crane.
Location	Main deck starboard side
SWL (Safe working load) For each hook	MW: 400Te @ R13m AW: 40Te @ R45.8m
Hook speed	MW Single Fall: 19.9m/min MW Twin Fall: 10m/min AW Single Fall: 75.4m/min
Man-riding certified (Yes/No)	Yes
Operability (limits to utilisation)	48.5kts (MW and AW)
Wire rope details	MW: 86mm, FLEXPACK 39(W) x K7, Steel Core, 1960, Galvanised, RHOL. AW: 34mm, FLEXPACK 39(W) x K7, Steel Core, 1960, Galvanised, RHLL.
Miscellaneous	Splash Zone Mode (SZM) installed and available to utilise on Main Winch (MW). Please refer to Crane Operations Manual for further information.

Table 9: 400Te Crane

6.2.2 58Te Crane

Category	Description
Class	DNV
Type	58 tonne NOV OC3426KSCE-(27-58)-(30-17)(20)(10-30) AHC heave compensated knuckle boom crane.
Location	Main deck port side
SWL (Safe working load) For each hook	MW : 58Te @ R17m (Internal Lift) AW: 11Te @ R30m (Internal Lift)
Hook speed (for each hook)	MW: 45m/min AW: 85m/min
Man-riding certified (Yes/No)	Yes
Operability (limits to utilisation)	48.5kts (MW and AW)
Wire rope details	MW: 52mm 35x7 WSC RHOL 2160 GRADE AW: 25mm 35x7 WSC RHLL 2160 GRADE

Table 10: 58Te Crane

6.2.3 10Te Knuckle Boom Subsea Cranes

Category	Description
Class	
Type	10 Tonne Seaonics Knuckleboom Diver Support Cranes
Location	A-Deck Port Side A-Deck Stbd Side
SWL (Safe working load) For each hook	10Te @ R15m (Internal Lift)
Hook speed (for each hook)	0-5Te: 65n/min 5-10Te: 30m/min
Man-riding certified (Yes/No)	Yes
Operability (limits to utilisation)	48.5kts
Wire rope details	30mm x 35x7 RHLL Galv

Table 11: 10Te Knuckle Boom Subsea Cranes

6.3 Winches

Category	Description
Type	Launch and recovery
Location	ROV Hanger
Use in operations	Launch and Recovery of ROVs
SWL	25Te
Maximum dynamic load	16Te
Wire rope details	

Table 12: Winch

6.4 Moonpools

Category	Detail
2 x Diving Moonpools	3.9m x 3.9m for bells
1 x Working Moonpool	7.2m x 7.2m for VLS

Table 13: Moonpools

6.5 Deck Services

Category	Detail
Stern section	Mooring winches and bollards are mounted on transom section below the main deck to keep the deck clear
Deck load	15 Te/m ² total 7000 Te
Deck plate	20mm (Reinforced to 40mm around work moonpool)
Cargo hold deck capacity	5 Te/m ²
D Deck load	10 Te/m ²
Hand rails	Hand rails around the main deck are removable
Bilge Keel	Bilge keel fitted either side of moonpool area (i.e. the moon pool region is clear of bilge keels)
Power outlets	4 x Utility stations – refer to MN036031-MNB-DW-0003
Seawater outlets	400T crane pedestal Outside Dive Emergency Gen. room Outside Deck Workshop
Fresh water outlets	400T crane pedestal Outside Deck Workshop
Working air outlets	8 Bar Working Pressure at locations indicated: 400T crane pedestal 400T crane internal 2 x Outside Deck Workshop Paint Store Outside moonpool area Mooring Deck

Category	Detail
	Workstation A-deck PS Workstation A-deck SB
Oxy Acetylene Supply	400T crane pedestal Deck Workshop
Soda Sorb	Outwards of PS Moonpool
Deck Machinery	2x Windlass / mooring winches – 60T (each with cable lifter, drum and warping end) 2x Mooring winches, 12T each

Table 14: Deck Services

*See drawing MN036031-MNB-DW-0003 Main Deck Utility for details for:

- Electrical Supplies
- Compressed Air
- Hydraulics
- Water

6.5.1.1 Electrical Supply Project Responsibility

Prior to connecting any project equipment to the vessels electrical supplies on deck, it is the project team’s responsibility to complete:

- MOS-EQU-F-004: “Project Electrical Supplies”

This should be completed for each item of equipment and this is to establish that the equipment to be connected is fit for purpose.

The project team should endeavour to carry this out 4 weeks in advance of their mobilisation, with the documentation sent to:

- Chief Engineer (deepexplorer.chiefengineer@technipfmc.com)
- Electrician (deepexplorer.electrician@technipfmc.com)

6.5.1.2 Compressed Air Project Responsibility

An 8-bar air supply is available from the ships compressors supplying the back deck.

Therefore, if the project team require compressed air at a value greater than 8 bar for extended periods, it is the project team’s responsibility to discuss this with the OCM. They may want to mobilise a high-pressure deck compressor so that they have a dedicated air supply on deck.

6.5.1.3 Hydraulics Project Responsibility

Project teams should liaise with the vessel to clarify that their requirement can be met by use of hydraulic connections on board. If this is not sufficient, it is the project team’s responsibility to mobilise the appropriate equipment.

6.6 Mooring Facilities

Category	Detail
Windlass	2 x NMD forward Max Pull 340KN
Mooring Winch	4 x NMD electric mooring winches 2x stern and 2x midships Max Pull 118KN
Anchors	2 x SPEK ANCHOR 7800Kg
Anchor Chain Cable	2 x 632.5m x Ø68mm

Table 15: Mooring Facilities

6.6.1 Mooring Winch Arrangements

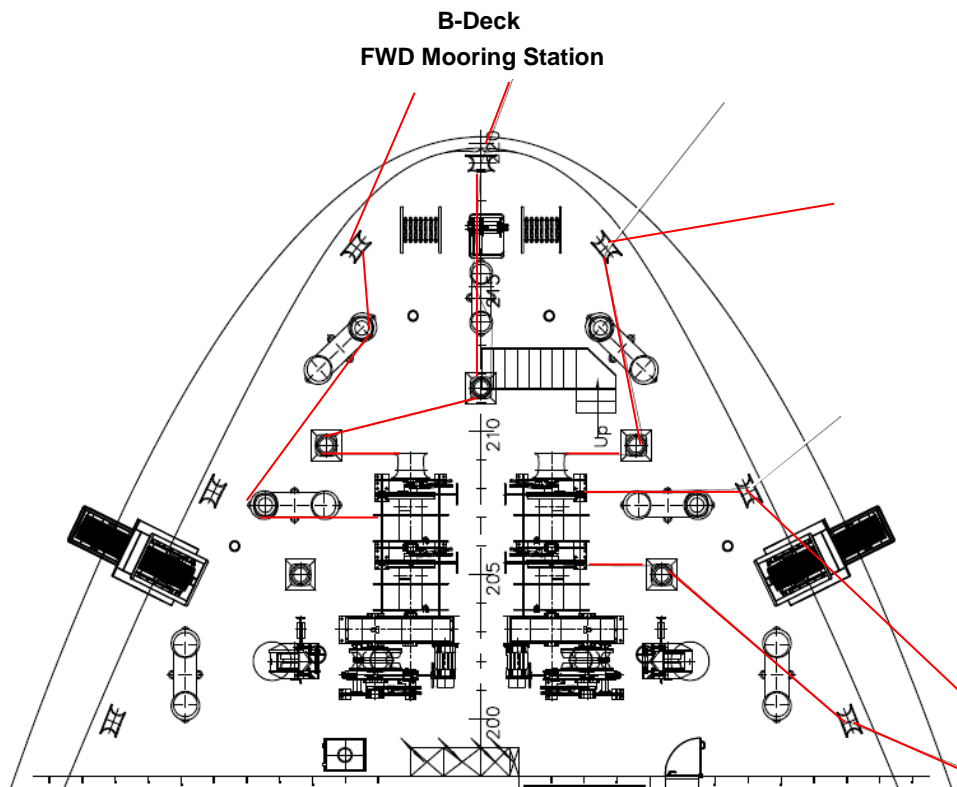


Figure 2: B-deck FWD mooring points:

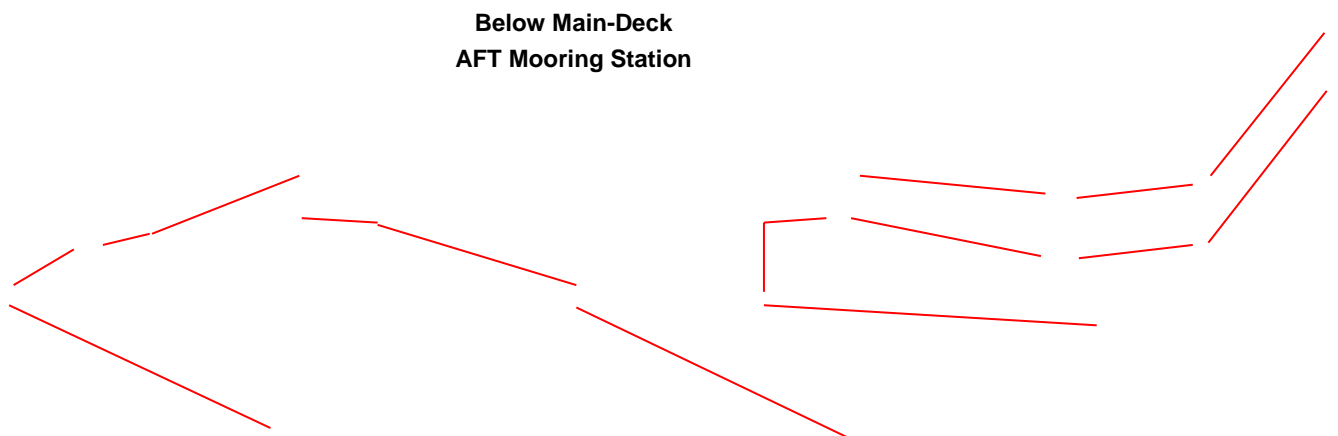


Figure 3: Below Main Deck AFT Mooring Points

6.6.2 Anchoring Arrangements:

Category	Detail
Windlass	2 x MND forward Max Pull 340KN
Anchors	2 x SPEK ANCHOR 7800Kg
Anchor Chain Cable	2 x 632.5m x Ø68mm

Table 16: Anchoring Arrangements

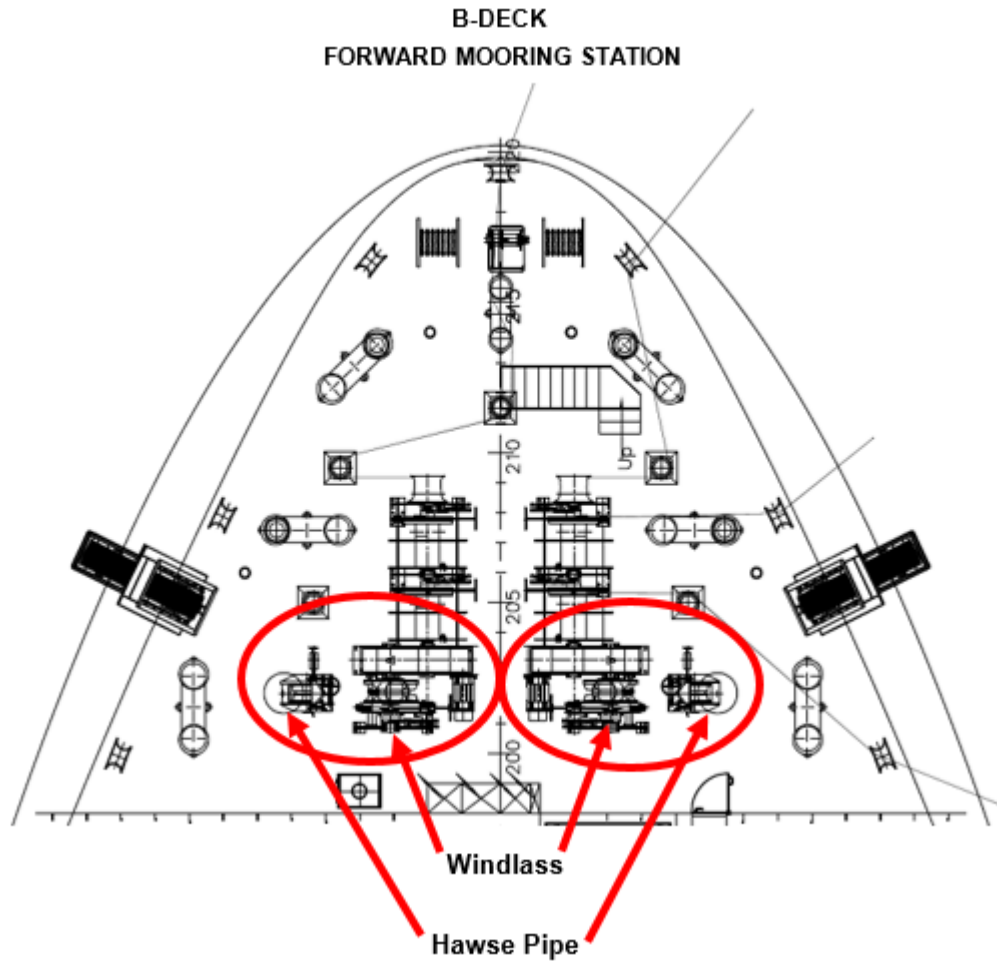


Figure 4: B-deck FWD mooring station

6.6.3 Fenders

Vessel has 4 x fenders located on D-Deck.

Category	Detail
Technical Spec	NoreqFender NPF2035CTN
Fender Dia, including chain and tyre net	2000mm
Fender Size, Length	3500mm
Weight	1504kg

Table 17: Fenders

6.7 Deck Strength

Category	Average Plate Thickness (mm)	Deck Load (Te/m ²)
Main Deck	20	15.0
VLS Pads	40	15.0
Mezzanine Deck (A-Deck)	8	3.0
Hatch Strength	20	15.0

Table 18: Deck Strength

6.8 Structural

All major loads that have to be attached to the upper main deck are to have the plans submitted to the T-MOS Naval Architects for approval. This is to ensure that they are supported by the main structural members.

The shear strake must not be cut. If a piece of equipment is required to overhang the ship's side it should be mobilised on "I" beams, which raise the equipment above the shear strake height.

No equipment is to be loaded on mooring stations on the aft deck or close to emergency escapes. There is to be no welding within 50mm of the edge of the Flush Deck Hatches. If this is absolutely unavoidable, T-MOS Naval Architects should be contacted to approve this on a case by case basis.

6.9 Padeyes

- Padeyes that are required for a project must be accompanied with certification even if fabricated for a specific purpose. The pad eyes must be large enough to take a shackle suitable for carrying out a proof load test of 1.5 x SWL.
- All pad eyes must be welded at the intersection of under-deck stiffening. Pad eyes that are to be used for over side work or large loads must have location approval given from the T-MOS Naval Architects.
- All welds to the deck are to be MPI tested before and after a proof load test.

6.10 Roll Reduction and Anti-Heeling

The vessel is fitted with a passive roll reduction and active anti-heeling system. This effectively reduces the vessels rolling motion when on station and assists in position keeping and crane handling capabilities.

The active anti-heeling system assists with heavy lift operations with the main crane. There are three independent Framo RBP 400-1 anti-heeling pumps that control the level in the tanks.

The anti-heeling system cannot be used at the same time as the roll reduction tanks. Roll reduction tanks should not be used during operations that may impose a static heel on the vessel in normal operations (i.e. crane operations).

Vessel should be consulted when planning a heavy lift which will require use of anti-heel tanks to be used to maintain vessel upright.

7 Dynamic Positioning (DP) System and Navigation Equipment

7.1 DP System

The vessel is DNV DYNPOS-AUTRO DP Class 3 and is fitted with a dual redundant Kongsberg K-POS Dynamic Positioning system. The Kongsberg DP-21 is a fully redundant system. The vessel has a Kongsberg DP-11 as a back-up. There are three UPS systems and a backup. Joysticks used onboard are cJoy OT (DP) and cJoy OT (separate controller unit) with Cwing.

The vessel is equipped with an emergency bridge, situated on the port bridge wing. The emergency bridge is separated from the bridge by A-60 bulkheads in order to comply with DYNPOS AUTRO notation.

Reference system	Note
Acoustic	2 x HiPAP 501; 1 x spare trunk and gate valve
DGPS	2 x Seapath 330, 2 x Veripos, 1 x DPS 132
Heading	Main: 2 x Gyro Compass Backup: 1 x Gyro Compass
Attitude	2 x MRU-5 + 1 x MRU-2
Position	Cyscan Mk 4 interface
Taut Sensor	2 x Light Weight Taut Wire Mk 15-500
Wind Sensor	Main: 2 x Gill Ultrasonic Wind Sensor Backup: 1 x Gill Wind Observer II Wind Sensor

Table 19: DP System

7.2 Navigation System

Equipment	Detail
Radar System	Furuno radar system FAR 3000 (X-band and S-band) FAR-3210 BB, FAR-3230S BB
Echo Sounder	Furuno ekkolodd FE-700, 50kHz
Auto Pilot	Anschütz NautoPilot 5500
Gyro Compass	2 x 133-407 Anschütz Bearing Repeater 360° 1 x 133-560.NG011 Anschütz Repeater Compass 360/10° 2 x 133-811 NG010 Anschütz Digital Repeater
Magnetic Compass	1 x Std. Magn. Compass Binnacle REFLECTA 1 - cutube version 1 x Spare Compass Type 11 1 x Anschütz Digital Repeater
GPS Navigator	2 x Furuno GPS GP-150 m/DGPS
Speed Log	Furuno Doppler Log, DS-60
Voyage Data Recorder	FURNO Voyage Data Recorder, Model VR-7000
ECDIS	Furuno Electronic Chart Display and Information System (ECDIS) FMD-3200
Navtex receiver	Furuno NX-700A/B

Equipment	Detail
AIS	Furuno UAIS Transponder FA-150
Facsimile Receiver	Furuno FAX-30
SeaQ Bridge Alert Management (BAM)	Vard Electro AS
GMDSS VHF	Sailor 6222 VHF DSC by Thrane & Thrane AS
Inmarsat C	Sailor 6110 GMDSS system by Thrane & Thrane AS LRIT = Sailor 6130 LRIT system
Light and Signal Appliances	Whistle & Gong Navigational Lights TEF 2840, 2850, 2870, 2898 by: Transberg AS Navigation Light Controllers TEF 4900 by: Transberg AS
MF/HF Radios	System 6000 MF/HF Thrane & Thrane AS
Portable GMDSS VHF	COBHAM SP3520 VHF GMDSS Icom IC-GM1600E GMDSS VHF Marine Transceiver
Sound Reception System	SRD 414/2 by: Zollner Signal GmbH

Table 20: Navigation System

8 Fire and Safety Equipment

8.1 Lifesaving Appliances

In accordance with SOLAS. Refer to vessel Fire & Safety Plan (held on portal page) for further information.

8.1.1 Lifeboats

Category		Detail
Lifeboats		2 x 65 Man Enclosed (LBT 850 C) 2 x 85 Man Enclosed (LBT 935 C) 2 x 24 Man SP Hyperbaric Lifeboats
Location	Port	100% @ 95kg per person
	Starboard	100% @ 95kg per person

Table 21: Lifeboats

8.1.2 Fast Rescue Boat (FRB)

A Fast Rescue Boat is provided for man overboard duties. It is DNV / NMD approved and is launched with a dedicated davit on the starboard side of the vessel.

Category	Detail
Manufacturer	Harding
Type	Stinger 630 Jet
Capacity	6 persons
Length	6.4 m
Beam	2.3 m
Speed (2x crew)	25 Knots
Weight (fully loaded)	2.03 Tonnes
Location	Starboard A-Deck

Table 22: Fast Rescue Boat

8.1.3 Liferrafts

Category		Detail
Liferrafts		4 x 20 Man inflatable
Location	Port	B-Deck: x 2
	Starboard	B-Deck x 2

Table 23: Liferrafts

8.1.4 Hyperbaric Lifeboat (HLB)

Category		Detail
HLB		2 x HLB (1 x Portside + 1 x Starboard)
Capacity		24 divers + crew (crew x4 for each HLB)
Details		SPHL 12169 hull 128/129
Weight		21,690kg (Fully Laden)
Engine		BUKH STEYR SOLAS M 1.4 marine diesel
Launch		Oceanwide HLBPD 13,00-24
Dimensions	Length	13.0m
	Breadth	3.35m
	Height	3.81m

Table 24: HLB

8.1.5 Lifejackets and Immersion Suits etc.

A grab bag (light stick, breathing mask and gloves) is provided 1 per person in each cabin.

Lifejackets are provided in 2 boxes located on D-Deck outside (158 pcs in total). An additional 14 lifejackets are located around the vessel: 4 Dive Control, 2 Sat Control, 2 Bridge, 2 ECR and 4 in crane cabs. Children Lifejackets (8pcs) are located in Fire Station 1.

Survival suits are provided at each muster stations (75 pcs at each side). An additional 10 suits are located around the vessel: 4 Dive Control, 2 Sat Control, 2 Bridge and 2 ECR.

Category	Detail
Lifebuoys	2 x with line (2.5kg) 10 x with light (2.5kg) 2 x with smoke and light (4.3kg) 4 x others (2.5kg)
Search and Rescue Transponder (SART)	2
Hand Flares	6
Survival Suits	160
Lifejackets	172
Smoke Signal	2
Rocket Parachute Flares	4
Line Thrower	4
Radar Transponders	2 x cNode Maxi 34-30V30H-R 3 x cNode Mini 34-180
Hospital	1
EEBD	41 + 2 spare

Table 25: Lifejackets and Immersion Suits

8.2 Alarm and Monitoring Equipment

Autronica Fire and security AS. Fully integrated fire detection and alarm system. System includes. Smoke, heat and flame detectors as well as Manual Call Point interfaced to alarm panels on the bridge and in the engine room. System also interfaced to the Integrated Automation System.

8.3 Firefighting Equipment

8.3.1 Fire Detection

DELTA spray deluge	Watermist	NOVEC – inert gas fire suppression
<ul style="list-style-type: none"> • Chamber room • Gas Storage Room • Gas Storage Outside • HLB Area • LARS Rooms 	<ul style="list-style-type: none"> • Engine Rooms • Engine Room Workshops • Thruster Rooms • Switchboard/PLC Rooms • Compressor Room • Dive Emergency Generator Room • HCU Rooms • SDC Winch Rooms • Winch Drive Rooms • SDC Gas Management Rooms 	<ul style="list-style-type: none"> • Sat Control • Dive Control • ROV Control • SDC Control

Table 26: Fire Detection

8.3.2 CO₂ Smothering System

8.3.2.1 TUROteknikk: CO₂ Fire Suppression System for Galley Duct

It is a requirement that an A60 damper shall be located between galley and accommodation since the galley is in a different fire zone. The damper onboard this ship is located in galley near grease filter. The duct from damper to damper is thick plated steel duct A60 insulated and the damper must be A60 insulated.

The duct shall be electric operated from the CO₂ release box and will in addition have an automatic closing by heat. The damper in the ends of the duct will close automatically after opening the CO₂ release locker door.

8.3.2.2 Equipment

- 5kg CO₂ cylinder with hand wheel valve.
- Flexible discharge hose
- 3 electronic switches for:
 1. Start of siren
 2. Stop of ventilation
 3. Automatic close of dampers in the lower end of the duct

8.3.3 Portable Firefighting Systems

Extinguisher	Specific	Quantity
CO ₂	5kg	43
CO ₂	22kg	1
Foam	9L	45
Foam	45L	2
Alcohol-resistant foam	9L	2
Powder	2kg	10
Powder	9kg	28
Powder	12kg	2
Powder	50kg	2
Wet Chemical	6L	1
Total		136

Table 27: Portable Firefighting Systems

8.3.4 Helideck Firefighting Systems

Category	Quantity	Detail
Remote Control Foam System	1	Remote activated actuator system to start or shut down foam
Breathing Air Compressor	2	75 L/min
Firefighting foam nozzle popups	19	145 L/min @ 4.1 bar
Fire Hydrant	3	Brass coupling
Fire hose	3	2 x 30m / 1 x 15m with foam inductor and nozzle
Helideck fireman's outfit	2	Separate outfits for Helideck use only
Fire extinguisher	2	foam compatible powder (50kg)
	1	CO ₂ (22kg)
Helideck crash equipment	1	All equipment as required by the Aviation Authorities local to UK North Sea.

Table 28: Helideck Firefighting Systems

9 Communications Equipment

The VSAT satellite service is an “always on” service provided by TechnipFMC. This provides fixed cost voice and data communications while the vessel is within the service operating area, called the satellite “footprint”.

Each vessel has a default satellite footprint which provides its service. When the vessel is operating out with that footprint, it will have no VSAT services. It is possible to change the satellite which will incur an additional service charge to be determined according to the area of operation requested.

For clarification of the standard service levels provided see the TechnipFMC IT Department document: *IT-054 TechnipFMC MariWan Service Level Agreement*.

9.1 External Communications

Note: the information presented below are deemed to be correct at the time of writing.

Equipment	Detail
IMO registration number	9729726
Call Sign	C6BZ7 (Charlie Six Bravo Zulu Seven)
MMSI Number	311 000 411
Satellite Communications:	
Bridge	+44 1224 270 740
Captain	+44 1224 270 742
Chief Engineer	+44 1224 270 747
Diving Chief Engineer	+44 1224 270 743
OCM	+44 1224 270 744
Project Office	+44 1224 270 745
Client Office	+44 1224 270 746
Hospital	+44 1224 270 753
Medic / Admin	+44 1224 270 741
Project Admin	+44 1224 270 748
Storeman	+44 1224 270 749
Instrument Technician	+44 1224 270 750
HSE Advisor	+44 1224 270 751
ROV Superintendent	+44 1224 270 752

Bridge	deepexplorer.bridge@technipfmc.com
Captain	deepexplorer.captain@technipfmc.com
Chief Engineer	deepexplorer.chiefengineer@technipfmc.com
Diving Chief Engineer	deepexplorer.divechiefengineer@technipfmc.com
OCM	deepexplorer.ocm@technipfmc.com
Project Engineer	deepexplorer.projectengineer1@technipfmc.com
Client	deepexplorer.client1@technipfmc.com
Medic / Admin	deepexplorer.medic@technipfmc.com
Project Admin	deepexplorer.projectadmin@technipfmc.com
Storeman	deepexplorer.storeman@technipfmc.com
Instrument Tech	deepexplorer.instrumenttechnician@technipfmc.com
HSE	deepexplorer.hse@technipfmc.com
ROV Superintendent	deepexplorer.rovsuperintendent@technipfmc.com
Inmarsat F	1 x Sailor 250 Fleet Broadband
Inmarsat C	2 x Sailor 6110 Mini-C GMDSS 50M
Navtex Receiver	1 x Navtex Mottaker NX-700B
Stationary Air VHF	2 x Jotron HELI VHF TR 810 Stationary Air Band Radio
Portable Air VHF	3 x ICOM HELI VHF Portable Air Band Radios with headset and charger
VHF Transceivers	2 x 406222A SAILOR 6222 VHF DSC A
Batteryless Telephone	Zenitel Batteryless Telephone unit VSP-213M-L
Intercom Telephone	Alcatel IP Touch 4018 Telephone
Portable VHF Radios	Motorola portable VHF, type DP4400
Portable UHF Radios	Motorola portable UHF, type DP4400
KU Band	Sea Tel 120TV
GMDSS	Sea Areas A1, A2 A3

Table 29: External Communications

Note: Deep Explorer UHF Radio Frequencies can be accessed as PDF on vessel portal page.

9.2 Internal Communications

Automatic Telephone Exchange

The vessel utilises an integrated IP telephone and analogue telephone system on board. SeaQ has provided the analogue telephones and intercom stations with the IP Telephones supplied by ALCATEL.

All crew have a telephone in their cabin and every office desk has a telephone. In addition, safety and project critical crew will be equipped with DECT telephones at all times.

Emergency Telephone System

The emergency telephone system includes sound powered phones at key locations in the vessel.

Public Address System

The public-address system is interfaced with the general and fire alarm system.

9.3 CCTV System

The closed-circuit TV system provided on board is an integrated analogue and digital system with the rack located in the data room on main deck level. This integrated system allows the CCTV video and audio output to be connected to the IPTV. The IPTV has the ability to display multiple CCTV images at one time.

9.4 Software

All up to date

9.5 IT Equipment

Full suite of IT equipment onboard in line with TMOS standard. For further details, contact Asset Manager / Operations Engineer.

10 Helideck

The helicopter deck is approved to serve helicopters with a maximum D- Value of 26.1. It has traffic control and waiting/changing room. The helicopter reception facilities comply with both British and Norwegian Civil Aviation rules and recommendations regarding helicopter transport.

Category	Detail
Helideck	Marine aluminium
Helicopter	Maximum D-Value 26.1
Maximum take-off weight	15.0Te
Diameter	26.1m
Classification	UK CAP-437, CAA-N BSL D5-1, Statoil TR2351, HCA and DNV Classification HELIDK-SH (CAA-N).
Certifying Authority	HCA

Table 30: Helideck

11 Accommodation and Facilities

11.1 Accommodation

All accommodation complies with the DNV Comfort ship C3 V3 standard and is fully air conditioned. Additionally, it complies with IMCO Part H Regulations for incombustible accommodation as required for passenger ships.

The vessel provides accommodation for 150 persons.

11.1.1 Cabins

Cabins are of modern European standard and all have an ensuite bathroom.

Quantity	Type	Class
2	Single Cabins	Captain
2	Single Cabins	Client
16	Single Cabins	Officer
1	Single Cabins	OCM
47	Single Cabins	Crew
41	Double Cabins	Crew

Table 31: Cabins

11.1.2 Hospital

The hospital is located on the main deck and has been designed and complies with TechnipFMC standards as per “NR006357-TN016 DSV Hospital Requirements and Design Suggestion”.

The galley is designated as the secondary triage area.

11.1.3 Other Accommodation

- Galley
- Scullery
- Provision rooms as to accommodate 150 persons
- Mess-room
- Two dayrooms
- Cinema
- Client Conference Room
- Gymnasium
- Laundry
- Duty mess
- Locker rooms



Figure 5: Duty Mess Main Deck



Figure 6: Cinema Main Deck



Figure 7: Gym Main Deck



Figure 8: Dayroom B-Deck

11.2 Offices

Deck	Personnel	Figure
Main	Training Room ROV Superintendent	14 & 15
Main	Crane Technician Storeman Instrument Technician Electrician	N/A
A	Project Office	12
A	Project Office Conference Room	13
A	Dive Chief Engineer Dive Tech (Mechanical) Dive Tech (Electrical)	N/A
A	Medic Admin Officer	N/A
A	Port & Stbd ISPS Reception	N/A
E	Captain Chief Engineer	N/A
E	Client Office	9
E	Client Conference Room	10
E	OCM	11
E	Chef Manager	N/A

Table 32: Office Space Layout



Figure 9: Client office E-Deck (3 x TechnipFMC PC's)



Figure 10: Client conference room E-Deck (Sits 16)



Figure 11: OCM Office (Diverless) E-deck

11.3 Project Office: A-Deck

PC / Desk Allocation:

OCM = Yellow, Project Admin = Pink, Project Engineer 1 = Green, Project Engineer 2 = Blue, HSE Advisor = Purple, Empty Desk = Red.

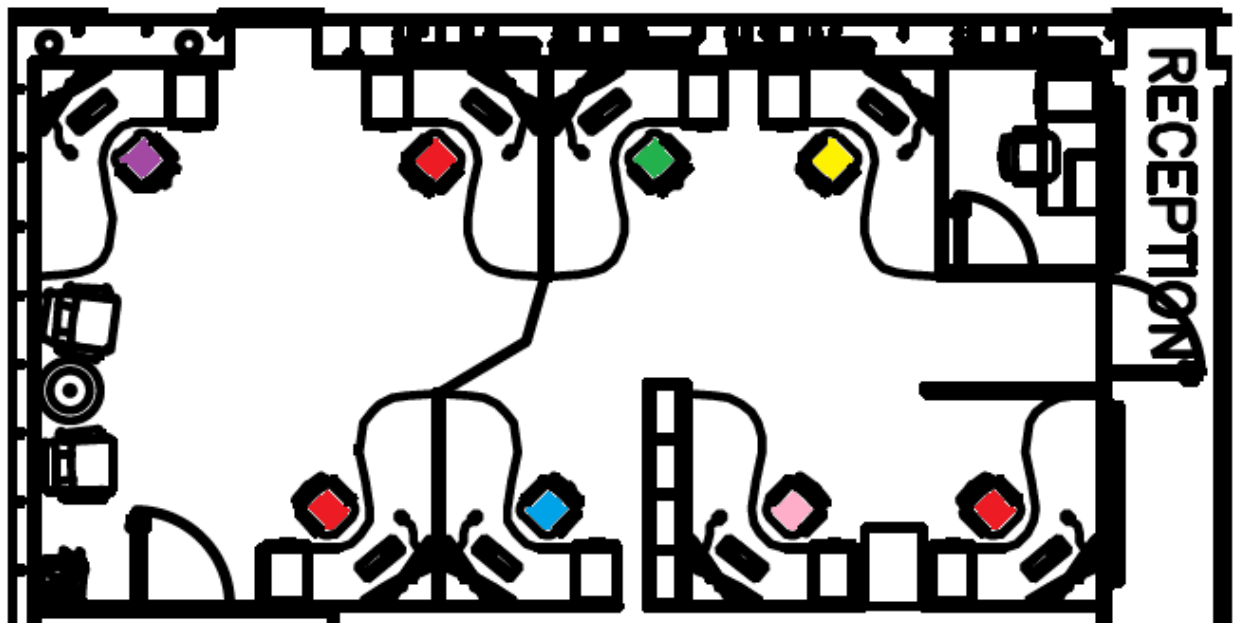


Figure 12: Project Office A-Deck



Figure 13: Project Office Conference Room A-Deck



Figure 14: U-Shaped Office Space Main-Deck (Training Room)



Figure 15: U-Shaped Office Space Main-Deck (ROV Superintendent)

12 Miscellaneous

12.1 Crew

Deep Explorer requires operating crew as shown in Table:

Group	Title	Number
Marine	Master	1
	Senior Chief Officer	1
	Chief Officer	1
	2 nd Officer	2
	Bosun	1
	AB	4
	Crane Operator	2
Engineering	Chief Engineer	1
	2 nd Engineer	2
	3 rd Engineer	2
	Crane Technician	1
	Motorman	2
Dive	Diving Chief Engineer	1
	Dive Technician (Electrical)	2
	Dive Technician (Mechanical)	2
Ancillary	Electrician	1
	Instrument Technician	1
	Medic / Admin Officer	1
	Materials Coordinator	1
Catering		
Construction Crew		

Table 33: Crew

Note: The vessel maintains experienced crane operators able to supply ad-hoc support to the project. Where intensive crane operations are anticipated, the project will be expected to supply additional personnel as per PRF Request. Project responsibility to discuss scope of work with OCM in advance.

Note: Catering levels will vary with vessel POB. Refer to Manning Procedure (MOS-HR-250).

Note: The above manning levels are not inclusive of Construction Crew to execute project. Depending on Scope of work, Construction Crew levels will vary. Project responsibility to discuss scope of work with OCM in advance.

12.2 Ice Class

The vessel meets the notation Winterised Basic. This means it must have features to allow continued operation in cold climates. Functions, systems and equipment are introduced to improve the safety of the vessel and personnel.

Winterization and ICE-C measures include:

- Protecting the vessel functions, systems and equipment considered important to safety
- Provisioning suitable equipment and supplies
- Implementing procedure for safe operation and personnel welfare.

Environmental Conditions for Winterized Basic:

Air Temperature	Sea Water Temperature	Wind Speed
< -20 °C	+4 °C without ice class -2 °C with ice class	20 m/s

Table 34: Environmental Conditions

All systems required for safety have electric trace heating including walkways, stairs, handrails, doors, bridge window, radars, fire line and helideck.

Vessel Dive System is not classed as Ice Class in terms of being able to operate in the Arctic Circle.

12.3 VLS

Deep Explorer has been designed to accommodate the VLS 7 and its associated equipment.

Structurally, the corners of the moonpool and the back deck aft of the diving hangar have been adequately strengthened to take the direct load of the VLS 7 tower and its associated traction winch.

There are two (2) manholes on either side of the deck (PS and SB) with access to the Deck Switchboard Room (PS and SB respectively). Through this manhole, the power supplies can be drawn from the Deck Switchboards to the VLS. There are two (2) covers for each manhole.

- Normal flush manhole cover with no penetration (To be used during regular operations)
- Manhole cover with Roxtec penetration (To be used with the VLS mobilised) To be provided by project.

The VLS requires a 440V 2500A 3 phase connection, this is usually connected from either side in the form of 2 x 1250A connections. The Deep Explorer exceeds this requirement as has 1 x 1500A and 1 x 1250A supplies on the deck switch boards.

In terms of water-cooling the VLS tower requires SW 500L/min @ Max 10bar. In many locations on main deck are SW 833.33 L/min @ 4bar and FW 415.66L/min @ 4bar. A requirement of 7bar compressed working air is needed for operation of the VLS. The Air on the main deck is 8bar, therefore, this exceeds the requirement.

13 Remotely Operated Vehicles (ROV)

13.1 General

The Deep Explorer is equipped with state of the art highly capable ROV systems to support the wide and varied workload of the vessel. This includes twin work class ROVs deployed by heavy weather launch and recovery systems from dedicated hangars and one Observation ROV.

	WCROV 1	WCROV 2	OBS ROV
Manufacturer	Forum Energy Technologies (Perry Slingsby)	Forum Energy Technologies (Perry Slingsby)	Saab Seaeye
Type	XLX 150	XLX 150	Tiger
Vehicle Identification	XLX 126	XLX 127	Tiger 839
Rated Working Depth	3,000m	3,000m	1,500m
Rated Power	150hp	150hp	N/A
Dimensions (ROV)	3.61m x 1.91m x 2.06m (L x W x H)	3.61m x 1.91m x 2.06m (L x W x H)	1.03m x 0.70m x 0.59m (L x W x H)
Mass (ROV)	5,000kg	5,000kg	140kg
Through Frame Lift Capacity	3,000kg	3000kg	N/A
Thrust (Fore / Aft)	1,100kgf	1,100kgf	43kgf
Thrust (Vert)	900kgf	900kgf	22kgf
Payload	300kg	300kg	N/A
Auxiliary Hydraulics (Dirty Work Pack)	Up to 129 LPM @ 207 Bar	Up to 129 LPM @ 207 Bar	N/A
TMS Type	Top Hat	Top Hat	Cage / Garage
Max Tether Length	750m	750m	100m
Location	Hangar Deployed, Port Side FR. 130	Hangar Deployed, STBD Side FR. 130	Deck Deployed, STBD Side
LARS Type	SEPRO ORS 18 (Gantry Deployment Frame with Electric AHC Winch)	SEPRO ORS 18 (Gantry Deployment Frame with Electric AHC Winch)	Hydramec A-Frame Deployment System
Nominal Deployment Speed	60m/min	60m/min	30m/min
Launch Limit	5.0m Hs	5.0m Hs	4.0m Hs
Skid Height Capacity	1.0m	1.0m	N/A

Table 35: ROV Specification

Note: the information presented is deemed to be correct at the time of writing. For current status, this can be obtained from RIS.

Note: System Design Depths listed. For current rated working depth, liaise with RIS.

14 Survey

14.1 Equipment List

Category	Description	Quantity	
		Online	Spare
Positioning Systems	Veripos LiD6-GG2 Integrated GPS / Glonass Mobile Receiver	2	0
	Verify QC PCs V1.08	2	0
	Kongsberg Seatex DPS132 DGPS receiver	1	0
Survey Systems	Rack-mount Online Nav (Primary and secondary) PC	2	1
	Rack-mount Processing PC	1	0
	Rack-mount Reporting PC	1	1
	Remote Survey PCs: <ul style="list-style-type: none"> • DP AFT Bridge • OCS PC, Bridge • OCM Office (E-Deck) • Project Office (A-Deck) 	10	
Differential Corrections	Veripos APEX ²	Yes	
	Fugro Seastar XP	Yes	
Survey Software	EIVA NaviPac version 3.8.5	2	1
Heading Systems	2 x Seapath 330 + 2x STD22 Gyro Compass	4	
Acoustic Navigation	Simrad HiPAP 501	2	
Motion Sensors	Kongsberg Seatex AS MRU5	3	
Transponders	CNode Maxi 34- 30V30H-R (DP1 & DP2) – Vessel DP Use Only	3	
	Mini beacon (Divers)	8	
	MST (ROV)	6	0
	Emergency Beacons	2	0
Additional Survey Equipment	Kongsberg survey box (2)	1	
	48-Port NETGEAR Rackmount Giga Switch	1	

Table 36: Survey Specification

Note: the information presented is deemed to be correct at the time of writing. For current status, this can be obtained from OED-TGR-056.

Note: the equipment list shown is spread supplied with the vessel. It is project team responsibility to engage with survey provider to ensure client requirements are met.

14.2 Survey Area

There are dedicated survey racks on the port side of the survey area. The table below lists the equipment mounted in the survey racks.

Category	Detail
Rack 1	Synology RS815
	MOXA 1
	MOXA 2
	Veripos 1
	Veripos 2
	Vessel Kongsberg Breakout box 2
Rack 2	1U Reporting PC
	Network Switch
	Space for DVR
	Space for DVR
	Top Raid
	Bottom Raid
Rack 3	Netgear Switch
	Network Patch Panel 1
	Network Patch Panel 2
	Fibre Patch Panel
	Sierra Larson Video Switcher
	Oceantools Overlay (dive)
Rack 4	Reporting PC
	Backup Master PC
	Master PC
	Processing PC
	Spare PC

Table 37: Survey Area

15 Dive System

15.1 System Description

Category	Detail
Manufacturer	Divex
Model	TechnipFMC 24 Man Norsok Dive System
Capacity	24 man
Maximum diving depth	350m
Compliance	Norsok U100, SOLAD 1974, Chapter 3, DNV-OS-E402 Offshore Standards for Diving.
Bell configuration	Ø2000mm inside diameter with 1.3:1 semi-ellipsoidal heads Internal volume 7.5m ³
Bell location	Main deck. Dive Control located on B deck
Bell standoff frame	Fixed Bell stage/ballast weight. It is supported by 4 hydraulically actuated supporting arms.
Chambers	6 chambers (2 x 6man, 4 x 3man), 6 x Entry Locks, 2 x Transfer Under Pressure (TUP). Volume of a living chamber: <ul style="list-style-type: none"> • 29.0m³ (6 Man) • 24.4m³ (3 Man) • 7.5m³ (Entry Lock) • 27.1m³ (TUP)
Life Boats	Two Hyperbaric Life Boats with diver direct access 24-man capacity each
Maximum number of different depths	Up to 6 different depths (<i>with no limitation whether these are saturation storage depth or decompression depths</i>)
Launch and Recovery System (LARS)	2 x 3 wire systems. Three winches are synchronised and provide redundancy for emergency recovery. → Capable of dual operation. <i>Note that the umbilical uses a separate winch that does not support the bell load (in constant tension mode).</i>
Gas storage capacity	<ul style="list-style-type: none"> • 72 cylinders of 2.5m³ @ 200bar • Total Gas Storage capacity 35,000m³ • Air Storage capacity 1,000m³ <p>Gas storage on D Deck for therapeutic, calibration gas, oxygen and extra heliox. D-Deck can take up to 8 x 64 rack quads.</p>
Chamber comfort features	Individual bed spaces Dimmable 3 colour mood LED lighting for improved lighting levels

Table 38: Dive System High Level Specification

15.2 Dive control

The dive control station is outfitted with all equipment necessary for conducting of safe diving operations. Communications throughout the vessel is possible from the Dive Control Room by a number of means including: -

- Public address system
- Automatic telephone system
- Point-to-point two channel headset units
- Talk back command system
- Direct open line communications with the bridge and all diving control stations plus vhf sets.
- CCTV

15.3 Gas Reclaim Systems

Gas reclaim systems are provided for both bells and the full divers living complex.

15.4 HLB Trial Fit-Up's

Vessel HLB's trial fitted to the below Hyperbaric Reception Facilities:

- NUI, Bergen
- MIMIR Marine, Hull
- TechnipFMC Owned MHRRF

+++ End of document +++