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Southern Indian Ocean Fisheries Agreement
Accord relatif aux Pêches dans le Sud de l'Océan Indien

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8th Meeting of the Scientific Committee (SC8)

Tenerife, Spain, 22-31 March 2023

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**REPORT OF MONACO EXPLORATIONS INDIAN OCEAN
EXPEDITION**

Monaco Explorations
submitted 08/03/2023

Document type	working paper ☐ information paper ☒
Distribution	Public ☒ Restricted ¹ ☐ Closed session document ² ☐
Abstract	
This information paper reports on the expedition undertaken in October and November 2022 in the Western Indian Ocean by Monaco Explorations in liaison with the Governments of Mauritius and Seychelles.	

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² Documents available only to members invited to closed sessions.

Introduction

Monaco Explorations “Indian Ocean Expedition” occurred between Reunion, Mauritius, and Seychelles onboard the South African oceanographic research and supply ship *S.A. Agulhas II* in October and November 2022. It involved more than 150 participants from about 20 nationalities, including scientists, young researchers and students at an onboard school, filmmakers and photographers, divers, artists, communicators, and the vessel crew.

The Expedition programme was developed in liaison with the authorities of Mauritius and Seychelles, based on the responses to a call for proposals and guided by an Advisory Committee of fourteen international experts, established in February 2021.

Authorisation was granted by the Governments of France, Mauritius, and Seychelles, and the Designated Authority of the Joint Management Area of the Continental Shelf in the Mascarene Plateau Region between Mauritius and Seychelles to conduct Marine Scientific Research in the maritime zones of France, Mauritius, Seychelles and in the Joint Management Area respectively.

The Indian Ocean Expedition is the first element of the Decade Action submitted by Monaco Explorations in response to the first Call for Decade Actions of the UN Decade of Ocean Science for Sustainable Development launched on 15 October 2020. The Monaco Explorations programme was endorsed as Decade Action No. 202 in June 2021. The Expedition itself was endorsed as Cruise No. EP49 by the 2nd International Indian Ocean Expedition (IIOE-2) in October 2022.

An overview of the Expedition was presented to the 7th Meeting of the SIOFA Scientific Committee on 23 March 2022. At the request of the Committee, the 9th Meeting of the Parties held in July 2022 welcomed and expressed its support for the scientific expedition.

Cruise Summary Information

Expedition Designation	Monaco Explorations Indian Ocean Expedition Monaco Explorations V055 IIOE-2 Cruise No. EP49
Expedition Leader	Gilles Bessero
Dates	1 October - 1 December 2022
Ship	<i>S.A. Agulhas II</i>
Flag	South Africa
Port of Registry	Cape Town
IMO Number	9577135
Call Sign	ZSNO
MMSI	601986000
Master	Knowledge Bengu
Ports of Call	Cape Town, South Africa Port Louis, Mauritius Le Port, Reunion, France Port Victoria, Seychelles Port Louis, Mauritius Cape Town, South Africa

Project Leaders	4SEA: Sylvain Bonhommeau, Ifremer, France GECOS: Jérôme Bourjea, Ifremer, France BGC Argo: Hervé Claustre, IMEV, France Sea Surface Drifters: Nick D'Adamo, UWA, Australia Coral Connect: Heather Koldewey, ZSL, United Kingdom Onboard School: Fabien Lombard, IMEV, France Saya de Malha: Francis Marsac, IRD, France MADCAPS: Margot Thibault, University of Reunion, France World Coral Conservatory: Didier Zoccola, CSM, Monaco Marine Mammal Observation: Bernard Rota, GLOBICE Reunion, France
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Resources

The Expedition was carried out through a time charter party onboard the oceanographic research and supply vessel *S.A. Agulhas II* owned by the Government of South Africa (Department of Forestry, Fisheries and the Environment - DFFE) and operated by African Marine Solutions (Pty) Ltd (AMSOL).

In addition to her standard crew and equipment (see Annex A), the additional resources were mobilized with the vessel:

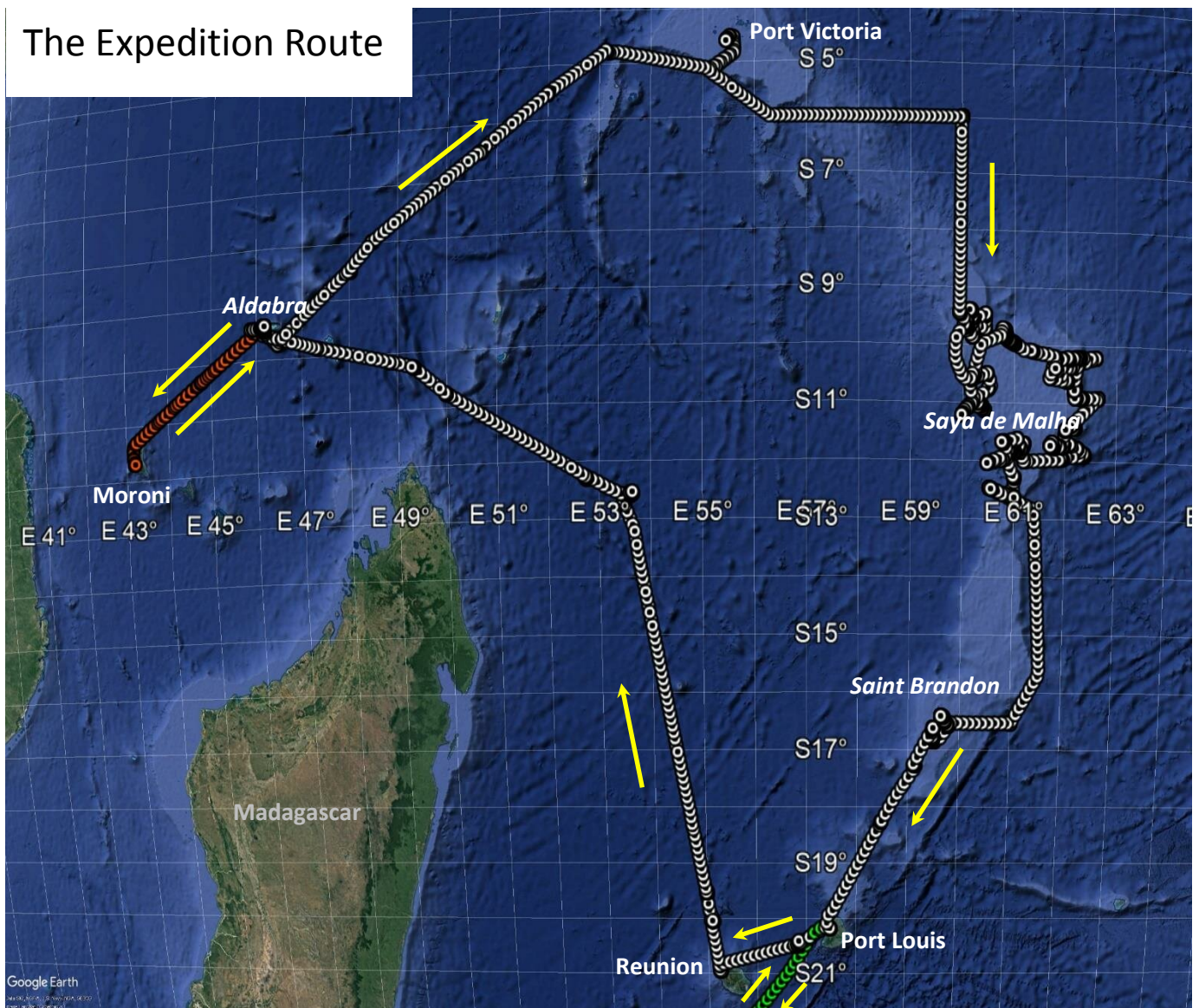
- Through the time charter party:
 - Two Hydro-Bios 25kg bottom samplers;
 - Two C-Worker 880 SRP dive support boats;
 - One ABS - SL containerized A1500 dive chamber;
 - One dive chamber supervisor and two coxswains, one of whom qualified as a dive chamber operator;
 - A 24/7 telemedicine service specialized in hyperbaric medicine activated during the diving periods.
- Through a separate service agreement between Monaco Explorations and Marine Solutions (Pty) Ltd:
 - One Saab Seaeye Cougar XT ROV;
 - the ROV Launch and Recovery System (LARS) with 700 m main lift cable;
 - the positioning service based on two Veripos DGPS position systems and one iXblue GAPS M5 USBL system with six mini beacons;
 - One Sound Velocity Profiler (SVP) Valeport MIDAS SVX2
 - One ROV supervisor, two ROV pilot technicians and one surveyor.
- Through the partnership agreements with the scientific partners of the Expedition:
 - Three types of towed gears for bottom sampling: two dredges, one beam trawl and one epibenthic sledge;
 - Underwater cameras;
 - Multinet and Bongo plankton nets;
 - Manta net;
 - Diving tanks and compressor;
 - Argo floats, sea surface drifters (SSD) and buoys (SVP);
 - XBT probes;
 - Tanks and accessories for the conservation of live coral samples;
 - Laboratory equipment for the analysis (salinometer, oxygen titrator, binocular magnifiers) and conditioning of samples.

Cruise Description

S.A. Agulhas II was mobilized in Cape Town, South Africa, from 26 September to 1 October 2022. She left Cape Town on 3 October.

The Expedition involved a voyage of approximately 10,000 nautical miles (18,500 km) from Cape Town and back and four stopovers in Mauritius, Reunion, Mahe (Seychelles) and Mauritius again. The two months of navigation were dedicated to various research and field operations. The activities took place during the transits, around the Aldabra Atoll (Seychelles), on the Saya de Malha Bank, to which 15 days of investigations were devoted, and finally around the island of Saint Brandon (Mauritius).

The Expedition Route



During the cruise, routine underway observations were recorded through the onboard scientific data system whenever possible, as indicated in Table 1.

Table 1
Routine underway observations

Parameter	Equipment	Comment
Current	Drop-keel mounted 75 kHz Teledyne RDI Acoustic Doppler Current Profiler (ADCP) system	The recording is stopped when the vessel steams above 14 knots.
Sea surface temperature (SST) and conductivity	Seabird SBE45 MicroTSG ThermoSalinoGraph flowthrough system	Several interruptions due to plumbing issues.
Depth	Single beam Simrad EK60 scientific echosounder (38, 120 & 200 kHz) Single beam Simrad EA600 hydrographic echosounder (18 kHz)	
Sub-bottom profile	Kongsberg TOPAS PS 18 parametric sub-bottom profiler (18 kHz)	System failure from 9 to 12 October.

Besides routine underway observations, three scientific projects began during the transit from Reunion to Aldabra with the deployment of Argo floats in conjunction with CTD stations (BGC Argo Project), the deployment of sea-surface drifters (SSD Project), and Manta net transects to collect microplastics (MADCAPS Project). All scientific observations were suspended during the transit in the Exclusive Economic Zone (EEZ) of Tromelin, whose jurisdiction is claimed by France and Mauritius. After entering the EEZ of Seychelles, about 10 hours were devoted to investigating a possible seamount signature during the night from 16 to 17 October.

S.A. Agulhas II reached Aldabra on 19 October. Three teams composed of nine scientists were transferred ashore to carry out their projects related respectively to:

- Monitoring marine turtles (GECOS Project);
- Assessing the coastal environment (4Sea Project);
- Monitoring plastic pollution (MADCAPS Project).

Later that day, the two dive teams operating from the vessel were deployed to start their investigations related to:

- Collecting coral samples (World Coral Conservatory Project);
- Assessing the connectivity of coral species and the associated invertebrate biodiversity (Coral Connect Project).

This was followed by the first ROV exploration dive off the west coast of Aldabra.

The following day was disrupted by an accident while launching one of the two dive boats. Unfortunately, one diver was injured and required a medical evacuation. The operations from the vessel were suspended while she transited to Moroni, Comoros. A detailed review of the procedures related to the launch and recovery of the dive boats and to dive operations was conducted, and the associated safety protocols were adapted accordingly.

Two Argo floats and one SSD were opportunistically deployed during the transit back from Moroni to Aldabra on the evening of 21 October.

The operations off Aldabra resumed on 22 October and continued as planned until 25 October. In addition to the scientific teams working ashore, day visits on Aldabra were organized for other participants in liaison with the Seychelles Islands Foundation team on the island.

A high-level delegation led by HSH Prince Albert II of Monaco and Mr Jean-François Ferrari, Seychelles' Designated Minister and Minister for Fisheries and Blue Economy, visited Aldabra from 24 to 25 October and then embarked on *S.A. Agulhas II* in the late afternoon of 25 October. The delegation

stayed on board until midday the next day for an intensive programme, including a tour of the ship, meetings with the crew and scientific teams, and a presentation of the investigations carried out during this first part of the Expedition.

After disembarking the delegation on Assomption Island, *S.A. Agulhas II* continued the scientific programme on the way to Port Victoria, Seychelles. The call at Port Victoria from 29 to 31 October marked the end of the first part of the Expedition with the changeover of many participants.

The second part of the Expedition was dedicated mainly to the multidisciplinary investigation of the Saya de Malha Bank and the continuation of the underway projects. In addition, a marine mammal observer joined the Expedition. The Saya de Malha Bank sequence took place from 2 to 17 November. It was followed by operations around Saint Brandon from 19 to 21 November. Then *S.A. Agulhas II* called again in Port Louis, Mauritius, from 22 to 24 November, where most participants disembarked. An overview of the Expedition was presented to HE Mr Eddy Boissézon, Vice-President of the Republic of Mauritius and Mr Sudheer Maudhoo, Minister of Blue Economy, Marine Resources, Fisheries and Shipping and other officials from Mauritius.

The small team that remained on board carried out the last three stations of the BGC Argo Project between Port Louis and Cape Town.

S.A. Agulhas II returned to Cape Town on the night of 30 November to 1 December. 1 and 2 December were devoted to the final demobilization operations.

Communication and Outreach

Communication and outreach were essential components of the Expedition.

Two artists and a film crew participated in the Expedition from Mauritius to Mauritius. A cameraman covered the leg from Mauritius to Seychelles, and a couple of photographers joined him from Reunion to Seychelles. A reporter and a photographer covered the subsequent leg from Seychelles to Mauritius. A third artist also joined this leg.

An onboard school was organized between Reunion and Seychelles. It was run by three teachers from the Oceanography Laboratory of Villefranche-sur-Mer (France) and was attended by twelve students from the Sorbonne University Master of Marine Sciences, eight students from the European International Master of Science in Marine Biological Resources (IMBRSea), five students or young researchers from Mauritius, and five students or young researchers from Seychelles.

During the leg from Seychelles to Mauritius, the participants from Mauritius and Seychelles benefited from training sessions led by IRD experts on processing and analysing CTD data, using NetCDF files for handling multidimensional scientific data, and international law of the sea and its relations with marine science. With regard to the third theme, a network of researchers working on “national or international seamounts, banks, and submarine structures” (WIO-Noise) was established.

Press tours, animations and visits for officials, school and civil society groups were organized during each stopover, involving about 500 visitors. In addition, eight interactive sessions were set up to discuss the onboard scientific and artistic activities with schools in France (Paris, Reunion), Monaco and Seychelles.

Regular news of the Expedition were posted in the dedicated section of the Monaco Explorations website and on social networks. More than 150 articles were published by different media during the Expedition.

The resources resulting from the Expedition are available here:

<https://www.monacoexplorations.org/en/ressources-mission-ocean-indien/>

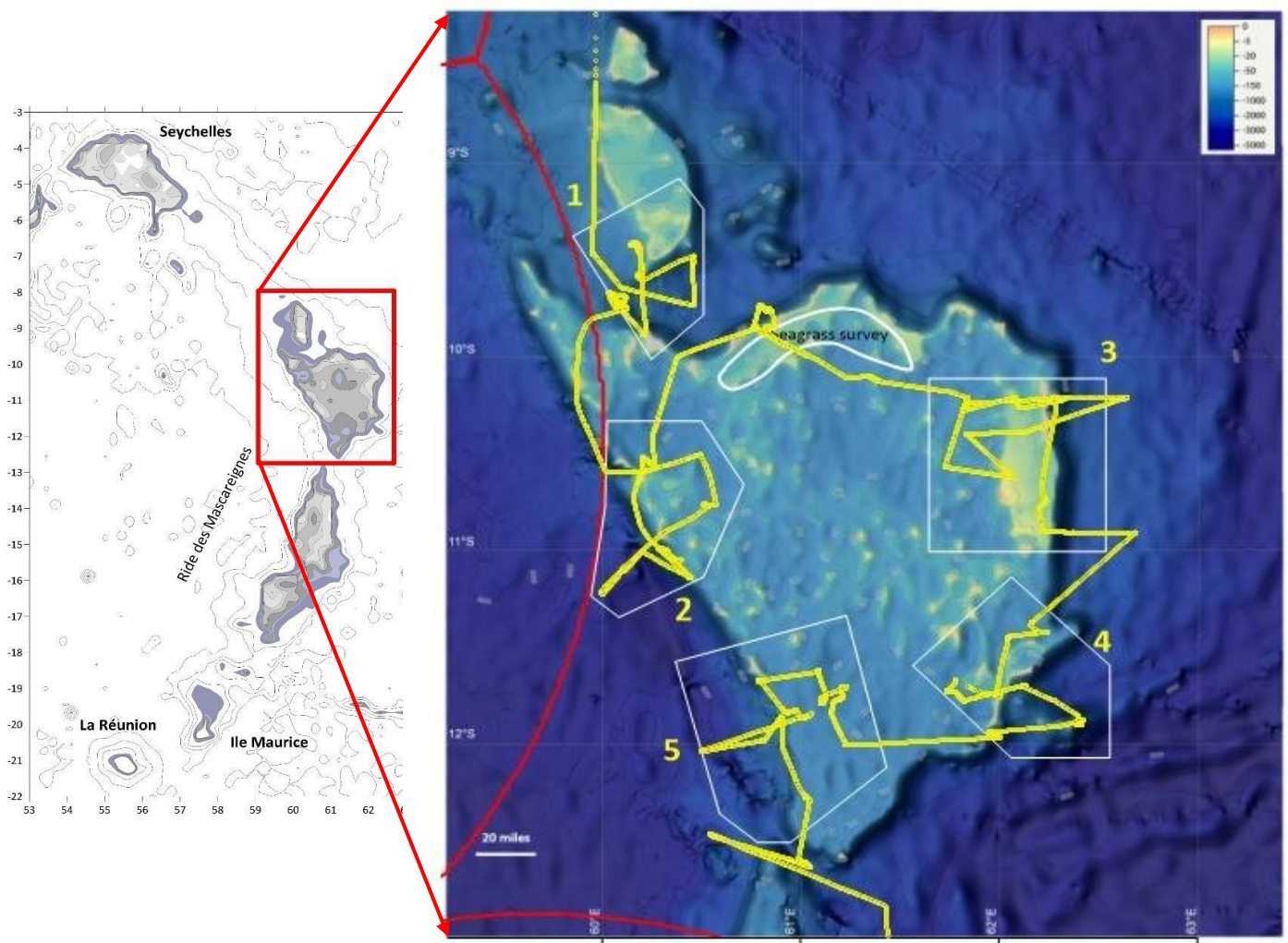
The metadata of the Expedition can be accessed through the IIOE-2 Metadata Portal at:

<https://iioe-2.incois.gov.in/metadata/ViewMetadata?fileid=163406f9-9596-4330-b7cb-60929cfa337c&app=iioe>

Preliminary overview of the investigation of Saya de Malha Bank

The investigation of Saya de Malha Bank was led by Francis Marsac, senior oceanographer and representative of the French Institute of Research for Sustainable Development (IRD) in Seychelles. It built on and fostered the regional collaboration between Mauritius and Seychelles, strengthening the bond between the scientific communities of the two countries.

Five sampling boxes and one seagrass area were investigated during this sequence.



The following operations were conducted:

- Physical and chemical oceanography:
 - 25 multi-sensor CTD stations
 - 19 XBT vertical profiles
 - 10 drifters deployed (3 SVP, 7 SSD)
- Microplastic sampling:
 - 7x3 Manta net transects
- Zooplankton sampling:
 - 20 Bongo net vertical casts (0-200 m)
 - 5 Multinet vertical casts (0-900 m)
- Diver sampling:
 - 12 sites (two depths per site)
- ROV exploration:
 - 7 dives (30-700 m)
- Habitat mapping with mini uncrewed surface vehicle (USV):
 - 6 hours of data collection
- Towed gears: 13 sites surveyed through a total of 46 short transects (170 to 800 m) to minimize the impact on the habitats:
 - 24 Warren dredge transects (depth range: 110-1,100 m)
 - 15 beam trawl transects (depth range: 80-1,500 m)
 - 7 supra benthic sledge transects (depth range: 70-1,000 m)

The collected samples indicate that the benthic biodiversity mainly comprises a variety of invertebrate organisms living inside or above the sediment. About 300-400 species of molluscs, 300 species of crustaceans and 100 species of algae were collected, including three species of gastropods and one species of crustacean that are considered undescribed. Rare “re-discovered” species include the giant clam *Tridacna rosewaterii*, *Conus primus*, and *Turitella*. Annex B illustrates some of the species that were collected. It is estimated that 20% of the molluscs living on the Bank may be endemic species potentially new to science.

The Expedition was supposed to monitor the marine vertebrate population through E-DNA analysis. Unfortunately, the team that had proposed this project dropped out at the last moment, and it was then too late to set up an alternative. Visual and moored camera observations identified very few occurrences of large fish or marine mammals. There were also a few sightings of seabirds.

The preliminary assessment of the MODIS satellite imagery and the oceanographic in situ data collected during the Expedition implies that the Bank plays a critical role in enhancing the biological productivity of the Mascarene Basin.

A fleet of Sri Lankan gillnetters fishing in the water column was observed in the East of Saya de Malha Bank.

Next Steps

The exploitation of the samples and data collected during the Expedition is ongoing. The preliminary report is expected in June 2023, and the final report in December 2025.

ANNEX A

SPECIFICATIONS OF S.A. AGULHAS II



‘S.A. AGULHAS II’

Steel Hulled, Ice strengthened Antarctic Supply / Oceanographic Research Vessel

SPECIFICATIONS

Classification	1A1 Passenger ship BIS Clean (Design) COMF (C-2, V-2) DAT (-35°C) C DEICE DYNPOS(AUT) E0 HELDK (S, H, F) LFL (*) NAUT(AW) PC (5) RP TMON Winterized (Basic)
Built	2011 STX Finland Oy, Rauma, Finland
Flag	South Africa
Port of Registry	Cape Town
IMO Number	9577135
Call Sign	ZSNO
MMSI	601986000

Cruising speed	14.0 knots
Maximum speed	18.0 knots
Range	15,000 nautical miles
Endurance	90 days
Complement	144 comprising 44 crew and 100 scientific/other staff
Affiliation	Manned and managed by African Marine Solutions (AMSOL) on behalf of Department of Forestry, Fisheries & the Environment (DFFE) Directorate Antarctica and Islands Republic of South Africa

MAIN DIMENSIONS

Length OA	134.0m
Breadth	22.0m
Maximum Draft	7.70m
GRT	12897T
NRT	3870T
Main Engines	4 x 3,000kW
Power	9,000kW shafts
Prop. Motors	2 x 4,500kW

PROPULSION

- Four uni-directional Wartsila 6L32 turbo-charged and intercooled 6 cylinder 4 stroke diesel engines directly coupled to four Converteam B128P8 Generators.
- Total power MCR 12,000kW, service power at 85% MCR 10,200kW
- Two Converteam N3HXCH2LL8CH Propulsion motors, Total power 9,000kW
- Two 750kW Rolls-Royce TT2000 DPN FP Bow thrusters, Total power 1,500kW
- One 1,200kW Rolls-Royce TT2400 DPN FP Stern thruster, Total power 1,200kW
- Bunker oil capacity: Maximum 3,009 tonnes, at 95% 2,858 tonnes.

ELECTRICAL POWER

- Generated for propulsion at 3.3kVA, 3 phase, 50Hz, by the Wartsila/Converteam combination mentioned above. From the above Hotel Services are supplied at 3 phase, 50 Hz, 400V
- Harbour Generator: Mitsubishi S12R-Z3MPTAW-4 diesel engine, developing 1351kVA, 3 phase, 50Hz, 400 v. Generator Stamford PM734CZ
- Emergency Generator: Volvo-Penta D 16MG diesel engine, developing 490kVA, 3 phase, 50Hz, 400V. Generator Stamford HCM534E-1
- 220v AC, 50Hz domestic supply
- 220v AC, 50Hz stabilized domestic supply.

NAVIGATION EQUIPMENT

- Integrated Navigation System by Raytheon Anschutz, GMBH, Kiel, Germany
- Gyrocompass 2 x Anschutz Type 22 Digital
- Autopilot Anschutz NautoPilot 2025
- Radars
 - 1 x Raytheon Anschutz S-Band 30kW ARPA Chartradar Blackbox System
 - 2 x Raytheon Anschutz X-Band 25kW ARPA Chartradar Blackbox Systems.
 - One fitted with a high-speed scanner.
 - 1 x Sigma S6 Integrated Radar Processing System, for ice navigation
- GPS
 - 2 x Saab R4 DGPS Receivers
- ECDIS
 - 2 x (Main + Secondary) Raytheon Anschutz ECDIS Blackbox Version with overlay (Ref appendice A1 – ENC Service Provider Certificate)
- Speed log Skipper DL850 2 Axis Doppler Log
- Echo Sounder Raytheon Anschutz GDS101 50/200kHz
- Conning Screen The ship's operating parameters such as position, speed, propeller pitch, rudder angle, wind direction, wind speed, etc. are displayed either in graphic or alpha numeric form on the bridge and in the Captain's cabin.

METEOROLOGICAL EQUIPMENT

- 2 x Lambrecht Weather Sensors, indicating wind speed and direction, air temperature, barometric pressure and relative humidity.
- Sea temperature given by the Skipper Log

DYNAMIC POSITIONING SYSTEM (LEVEL 1)

- 1 x Navis 4001 DP System
- 1 x Navis 4011 Joystick Control System
- 1 x Model LID3-G1 DGPS Receiver for the DP system
- FMEA trials not conducted
- Vessel not classed as a DP vessel

COMMUNICATIONS

- Radio and Satellite Equipment, to GMDSS Sea Area 4

BRIDGE Communication Console

- 2 x Raytheon Anschutz MF/HF DSC Radio Controllers CU 5100
- 1 x Raytheon Anschutz VHF DSC Controller RT 5022
- 1 x Sailor Inmarsat C Message Terminal TT3606E
- 3 x Raytheon Anschutz printers H1252B/TT-3608A for above
- 1 x Raytheon Anschutz GMDSS Alarm Panel AP 5042
- 3 x Sailor GMDSS VHF Portable Radios, SP 3520
- 1 x ICOM Air band Portable VHF Radio (With headset and microphone)

Bridge Main Console

- 1 x Raytheon Anschutz VHF DSC Duplex Controller RT 5020
- 1 x Motorola GM 360 UHF radio
- 1 x Raytheon Anschutz GMDSS Alarm Panel AP 5065

Bridge Helicopter Console

- 1 x Raytheon Anschutz VHF Radio Controller CU 5000
- 1 x Becker Air band VHF Radio
- 1 x Motorola VHF Radio DM 3600

Bridge Starboard Console

- 1 x Sailor VHF Radio 6210

Bridge Port Console

- 1 x Sailor VHF Radio 6210

Bridge, After Bulkhead

- 1 x SARTs, Sailor 6913A-SART (1 Port, 1 Starboard)
- 1 x EPIRB, TRON 40S Mk II 406 Mhz

Monkey Island (Deck 10)

- 1 x EPIRB (Float Free), TRON 40S Mk II 406 Mhz
- 1 x VDR Capsule

Bridge, Office

- 22 x UHF Radios, Motorola
- Navtex Receiver, NCR-333
- Weather Facsimile Receiver, Raytheon Anschutz Blackbox FAX-30

SCIENTIFIC WINCHES

- 1 x Rapp Hydema HW 2300 E CTD Winch, 6,000m x 11.73mm conductor cable (usable cable 5850m)
- 1 x Rapp Hydema HW 2300 E CTD Winch, 6,000m x 12mm Kevlar cable (usable cable 5190m)
- 1 x Rapp Hydema HW 200 E Vertical Plankton Winch, 1,650m x 6.35mm conductor cable (usable cable 538m)
- 1 x Rapp Hydema DSW-4006 E Deep-water Coring Winch, 5,000m x 14mm SWR (usable cable 4100m)
- 1 x Rapp Hydema HW 500 E Plankton Towing Winch, 2,500 x 11.73mm SWR (usable cable 1980m)
- 1 x Rapp Hydema HW 500 E General Purpose Towing Winch, 2,500m x 12mm SWR (usable cable 1900m)
- 1 x Rapp Hydema HW 500 E Undulating Vehicle Winch, 760m x 8.41mm SWR (100m faired) (usable cable 580m)

MOORING WINCHES

- 1 x Hatlapa Electric Windlass with 2 x 160kN @ 5/15m/min.
Cable Lifters and 2 x 150kN @ 15/30m/min. Warping Drums
- 2 x Hatlapa Electric Capstans, 100kN @ 15/30m/min
- 1 x Rapp Hydema CF 600 E General Purpose Capstan, 3.0T @ 12m/min

LABORATORIES

- Meteorological laboratory
- Operations Room
- Underway Sampling Laboratory
- Wet Biological Laboratory
- Dry Biological Laboratory
- Wet Geological Laboratory
- Liquid Scintillation Counter Laboratory
- General Chemistry Laboratory.
- Provision made for 6 "Own-User" Container Laboratories on deck aft.

SCIENTIFIC WORKING AREAS

- Helicopter flight deck and hangar, when available
- Enclosed poop deck space of 400m² with a 50m² wooden working deck served by a hydraulic A-frame with 6 loadingpoints and a vertical sliding stern gate.
- AFT deck 4T SWL Deep Corer Davit by Triplex, with a 1T SWL Deep Corer handling Frameattached.
- The Environmental Hangar boasts a Triplex A-Frame for CTD deployment, with a SWL of 7T

ON BOARD SCIENTIFIC SYSTEMS

A Network Data System acquires data from selected navigational, meteorological and scientific instrumentation. The data is sent to a dedicated server once per second and mean values logged once per minute. The real time data is transmitted continuously over the LAN and the logged data is made available in a shared folder on the network.

- Seabird 911 CTD and Rosette Sampling System
- Seabird S38 Remote Temperature Probe
- Seabird SBE 45 Thermosalinograph and De-Bubbler
- Kongsberg Topaz P18 Sub-bottom Profiler
- A Moon Pool, dimensions 2.4 x 2.4m, for CTD deployment in ice covered waters

A Drop Keel, extending to a depth of 3.0m, containing:

- Scientific Echo Sounder, Simrad EK 60, 38/120/200kHz
- Scientific Deep-Water Echo Sounder, Simrad EA 600
- Acoustic Doppler Current Profiler, RDI Instruments Ocean Surveyor II, 75kHz

ADDITIONAL SCIENTIFIC & LABORATORY EQUIPMENT

- Grab Sampler + Backup unit
- Seabird 911 CTD and Rosette Sampling System (Back up unit)
- Milli-Q water generator
- Microbiological Safety cabinet with vertical laminar flow hood

Available to Charterer

- Cold storage
 - Blast Freezer (-20) – scientific store. 1.85 m3
 - Freezer (-20) – scientific store. 7.14 m3
 - Scientific cold store (+5) DK3 aft 19.15 m3
 - Cargo freezer (-20) DK 3 fwd 21.71 m3
 - Cargo freezer (-20) DK 3 fwd 26.32 m3
 - Mini freezers (-20) Port aft lab 0.12 m3 x 3 units
- 2 x -80c Freezers (one for chemistry + one for biological samples)
 - Upright freezer (-80) Port lab aft 0.83 m3 x 3 draws
 - Chest freezer(-80) Port aft lab 0.29m3

Not Available to Charterer

- Cargo fridge (+5) DK 3 fwd 10.84m3 (used for ship stores)

HABITABILITY - ACCOMMODATION

All officers and crew are housed in single quarters. Vessel is air conditioned as well as heated for Antarctic conditions.

Passenger accommodation:

- 2 VIP suites
- 16 single berth cabins,
- 15 two berth cabins
- 13 four berth cabins
- Upper and lower passenger lounges
- Library
- Live TV, via satellite, streamed to all cabins
- Full laundry facilities
- Fresh water capacity is 290T supplemented by a 28T/day fresh water generation capability when at sea
- Hospital with surgery facilities
- Doctor
- Small gymnasium, with sauna, shower and change room facilities
- Baggage Room

LIFE SAVING APPLIANCES

- 2 x FRC's
- 254 x Life Jackets
- 150 x immersion Suites
- 19 x Lifebuoys
- 6 x (25 Man) Life Rafts
- 2 x (75 Man) Life Boats

CARGO CAPACITIES AND CARGO HANDLING EQUIPMENT

- Three cargo hatches, all with tween deck and lower hold.
 Total dry cargo capacity:

Bale	3801m ³
Grain	4602m ³
Refrigerated space	79.4m ³
Cargo oil capacity	510m ³ /408T
- 1 x TTS 35T @ 27.5m at 17m knuckle boom cargo crane on forecastle head
- 2 x TTS 10T @ 10m knuckle boom cargo cranes forward
- 1 x TTS 5T @ 18m knuckle boom stores crane aft
- Two large 10m inflatable rafts with a working capacity of 15T per paired rafts
- One 2-ton Electric Forklift Truck.

HELICOPTER SUPPORT AND FACILITIES

- Enclosed hangar facilities for two PUMA size helicoptersManual sprinkler system for hangar
- 113T JetA1 bunker capacity
- Helicopters fitted with flotation gear, winches and cargo slingsLong range tanks available
- Skid fittings
- Radar and GPS receivers fitted

RADIOS

- 1 HF SSB transceiver
- 2 VHF (AM) aeronautical transceiver, and
- 1 VHF (FM) marine band transceiver

OTHER FEATURES

- Roll damping tank
- Ice breaking heeling tank/pump system
- Closed circuit television available to points around the ship
- 2 x 200hp 10-man SOLAS Fast Rescue Craft
- 1 x 230hp Weedo 710 Tug/Workboat, Bollard Pull 2.2T
- 1 x 40hp 4-man inflatable dinghy for inshore scientific work
- CO2 flooding system for machinery spaces and cargo holds
- Automatic water sprinkler system for accommodation spaces
- Inert gas system for JetA1 pump room/tank space
- Foam monitor cannons for flight deck and cargo deck helicopter operations
- Remote control fire retarding doors for accommodation space
- Cross flooding system for damage stability
- CATHELCO impressed current, cathodic protection, system

VSAT FACILITIES

- Bandwidth Speed: 16 384/4096 (MIR)– 8192/2048 (CIR) (2:1 ratio) specifically enhanced for this charter only. Unlimited data, but this is subject to the number of Users on the system, location strength, and the controls put in place.

OFFICE & WORKSHOP FACILITIES

- Office spaces – Business Center with 8 Computer desks, incl Meeting room for 6 persons.
- Conference Room – 1 by 120 Person possible to split into 2 rooms.
- Video Conferencing System - Blackmagic Atem Mini pro video mixer with Rode dual wireless microphone & transmitter kit, Canon XA 11 video cameras, Rode Interview Go video handle & POP filter handheld audience microphone, Sirui K-10II Ball Head for roof mount & wall mount, streaming PC and 2 x video monitors.
- Workshops – DEFF Electronics workshop, Operations Room in Environmental hanger,
- various lab areas.
- Helicopter Briefing room

MEDICAL EQUIPMENT

- Anesthetic Machine
- Ventilator
- Mobile X-Ray unit
- ECG & blood pressure function of LifePak defibrillator
- Infusion pump for IV fluid infusion
- Monitor in ward: Blood pressure, saturations, pulse
- Hyfercator
- Theatre Light

The supplies, consumables and other items as listed in Annex C.

DIVING EQUIPMENT

- Diving Chamber
- DMAC Medical Kit
- Medical Oxygen
- 2 x RIB

NOTE : This specification sheet is EXCLUSIVE to the Monaco Expedition Charter Oct – Nov 2022

ANNEX B

Examples of benthic species collected on Saya de Malha Bank



Bolma sp



Lamellarinae



Stenopodidae



Tridacna rosewaterii



Conus primus



Nudibranchs (sea slugs)



Plathelminthes *Polycladida*



Crustaceans



Echinoderms



Demersal fish