



# R/V OceanXplorer

## Spec Sheet

### GENERAL SPECIFICATIONS AND CAPACITIES

*Class: DNV +1A1, SF,E0,DYNPOS- AUTR,CLEAN,COMF-C3-V3,HELDK-SH,NAUT-OSV(A),ICE-C  
Special Service / Research Vessel  
Unrestricted Navigation*

|                                    |                                         |
|------------------------------------|-----------------------------------------|
| Launched                           | 2010                                    |
| Refitted                           | 2023                                    |
| Flagged                            | Marshall Islands                        |
| IMO Number                         | 9533373                                 |
| Length Overall                     | 87,10 m (285,76 ft)                     |
| Breadth Overall                    | 21,40 m (70,21 ft)                      |
| Maximum Draft                      | 7,80 m (25,59 ft)                       |
| Air Draft                          | 33 m (108,27 ft)                        |
| Gross Tonnage                      | 5399 tons                               |
| Net Tonnage                        | 1620 tons                               |
| Displacement                       | 6128 tons                               |
| UMS Speed                          | 16 knots                                |
| Accommodation                      | 72 max persons                          |
| Main Engines                       | 4 x Caterpillar 3516B 1900kw@1800rpm    |
| Harbor Generators                  | Scania DI16 640 kW @ 1800rpm            |
| Propellers                         | 2 x Rolls-Royce Azipull 100 2,2MW each  |
| Bow thruster                       | 2 x Rolls-Royce TT 1150kW each          |
| Bow thruster                       | 1 x Rolls-Royce Dropdown 1400kW         |
| Stabilization                      | Rolls-Royce Aquarius Folding Fin System |
| Sewage Treatment                   | Jets DVZ-SKA70 BIOMASTER                |
| Oily Water Treatment               | GEA Westfalia 2,5m3/h 5ppm.             |
| Water makers                       | Aquamar 60m3/24h                        |
| Ultraviolet Water Treatment        | Ueberall UBK4 16m3/h                    |
| Ballast Treatment system USCG app: | AlfaLaval Compact PB0226                |

#### **Tankage**

|                |       |         |
|----------------|-------|---------|
| Fuel           | Fresh | 1084 m3 |
| Water:         |       | 270 m3  |
| Ballast Water: |       | 1546 m3 |

OCEANX

## **R/V OceanXplorer Facilities**

### **Science Facilities & Equipment**

- Dry and wet labs (*note not all equipment is listed here*)
  - DNA Sequencers (see Molecular)
  - Thermocycler with qPCR capabilities
  - Microscopes (Spinning disc confocal, light sheet, fluorescence stereo)
  - Blue light illumination setup
  - pH meter (YSI)
  - Horiba DO/temp/salinity probe (10-m cable)
  - Planktoscope
  - Refrigerated Centrifuge (Eppendorf), 5424R
  - Nanopore Spectrophotometer, Qubit Fluorometer
  - Cameras (Hamamatsu Camera, Sony A7S II Camera, Canon ME-20, Cubert Ultrix x20 hyperspectral camera)
  - Computers with software suite for analysis
  - 3D printers
- Molecular Lab & Sequencing Devices
  - MinION – benchtop or portable, capable of real time sequencing up to 50GB from a single MinION flow cell
  - GridION – benchtop device capable of up to 250 GB of sequencing data output and parallel processing of up to 5 individual sequencing runs using minION flow cells
  - PromethION – large scale RNA and DNA sequencing, population scale sequencing with up to 48 minION flow cells, up to 290 GB sequencing data output (14 TB at full capacity), whole genome sequencing capable
  - epMotion 5075t – automated liquid handling robot for simultaneous processing of 96 samples, heated element for incubation and PCR
- Aerosol Lab
  - GRIMM GRIMM 665+CPC System<sup>1</sup>
  - RIEMER DIGITEL DHA-80 High Volume Aerosol Sampler<sup>2</sup>

<sup>1</sup> Includes an EDM 180-F, Environmental Dust Monitor, SMPS+C 5420 Scanning Mobility Particle Sizer + Counter, and CPC 5421 Condensation Particle Counter

<sup>2</sup> Digitel High Volume Samplers DHA-80, operation range in standard execution is 100 to 1000 l/ resp. 6 to 60 m<sup>3</sup>/h

## R/V OceanXplorer Facilities

### Science Facilities & Equipment (Cont.)

- CTD
  - 5500 meter
  - Underwater unit, Sea-Bird 9Plus
  - 2x Temperature sensor, Sea-Bird 03Plus
  - 2x Conductivity sensor, Sea-Bird 04C
  - 2x Dissolved Oxygen sensor, Sea-Bird 43
  - Altimeter, Teledyne Valeport VA500
  - Chlorophyll/Turbidity sensor, WETLabs ECOFLNTURTD
  - Transmissometer, C-Star
  - Rosette: 24 Niskin bottles (10L volume each)
- Built in collection systems and scanners (mapping systems expanded on page 5)
  - Flow through system (Debubbler, Flowmeter, Fluorometer, Transmissometer, AML SVT, SBE38, SBE45 MicroTSG, SUNA V2 Nitrate sensor)
  - Meteorological sensors, Vaisala WXT536
  - Irradiance sensors, BioSpherical QCR2150A PAR
  - Eppley PSP/PIR radiometer sensors on the mast
  - Multibeam sonar (Kongsberg EM304 and EM712)
  - Fish finder echo-sounder (Simrad EK80)
  - ADCP (RDI Teledyne WH300 and OS75)
  - Knudsen CHIRP 3260
- Other Equipment
  - DJI Matrice M600 Pro UAV
    - w/ DJI Zenmuse X5 w25mm lense and Ronin Gimbal
    - Flight time: 10-25min
  - DJI Mavic Pro 2 with Dual Enterprise
    - w/ Resonon Hyperspectral Camera (Pika XC2, 400-1000nm range)
    - Flight time: ~30min
  - 3D Photogrammetry Rig
  - OSIL 6M Gravity Corer
  - Hydrophone array (model TBD)
  - Liquid Nitrogen Generator (10L per day, 20L of storage)
  - Hydrophone Kit | with H2d Hydrophone - 3m cable, DR-05X digital recorder
  - RBR Maestro3 hand-deployable CTD with PAR, dissolved oxygen and multi-channel fluorescence sensors. 6000m depth rated.
  - Bongo Net, 300mm diameter, 2.48m long<sup>1</sup>
  - Plankton Nets<sup>2</sup>
  - Ascension depth profiler [maximum deployment depth of 400m (1300ft)]<sup>3</sup>



<sup>1</sup> Net with cod end diameter of 110 mm with one net of mesh size 53µm and second net with mesh size 250µm

<sup>2</sup> Each 250mm diameter and an 550mm long bag, with mesh sizes of 53µm, 100µm, and 250µm

<sup>3</sup> With seven sample valves and pump throttle; water temperature, depth, flow rate, and total volume filtered logger, maximum deployment time of up to 15 days, for sampling of e.g., suspended particulate including environmental DNA (eDNA), microplastics and microfibers, total / dissolved organic carbon (TOC), plankton, suspended sediment

## **R/V OceanXplorer Facilities**

### **Media Facilities**

- Media center
    - 2 full edit stations, 1 assist station
    - 225TB Shared storage with backup
    - LTO8 for archiving and transport
    - Live Video streaming capabilities
    - Live recording of shipwide intercom system
    - Video playback on a large screen for review
    - Video conference capabilities
  - Dedicated tank filming room
  - Wet and dry camera storage & preparation rooms
  - DJI Mavic 3 Pro UAV (unmanned aerial vehicle – media drone)
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### **SCUBA Diving Facilities**

- BCDs, regulators, masks, fins, rash vests, wetsuits (1mm, 3mm, 5mm, 7mm) and dry suits to equip up to 12 divers in all sizes
- Two types of rebreathers
- Dive Cylinders (air, EANX, tri-mix, oxygen, diluent)
- Multiple breathing gasses including Air, Nitrox, Tri-Mix and Oxygen
- 4 full face masks with comms (capable of communicating diver to diver, diver to the surface, diver to submersibles)
- Variety of Diver Propulsion Vehicles (underwater scooters)
- Full emergency medical support including:
  - Hyperbaric Recompression Chamber (up to 4 people)
  - SOS Hyperlite portable Hyperbaric Recompression Chamber
  - Emergency oxygen gear
- High Pressure Gas System (Banked breathing gas)
  - Air – 12X 80Litre 300Bar cylinders
  - Nitrox – 16X 80Litre 300Bar cylinders
  - Oxygen – 21X 80Litre 200Bar cylinders
  - Tri-Mix – 4X 80Litre 200Bar cylinders
  - Helium – 4X 80Litre 200Bar cylinders
  - Heliox – 2X 80Litre 200 Bar cylinders
  - 2X Bauer Verticus 680l Air Compressors
  - 1X Bauer Verticus 450l Nitrox HP compressor, Bauer RS 3-55 LP compressor, Bauer B-TROX-FO2 Membrane (for blending Nitrox onboard)
- Cameras & Media
  - Red Komodo with Gates housing including wide and macro lenses
  - Canon EOS R5 C with Nauticam housing
  - Panasonic GH5 with Nauticam housing
  - 2x Panasonic GH4 with Nauticam housings
  - Variety of action cameras (GoPros and Insta 360°)
  - Split rig system for filming half underwater, half above water

## **R/V OceanXplorer - Mapping & Acoustics Systems by Asset (consolidated)**

### **OceanXplorer (Deep Water Survey)**

#### Multibeam echosounders

- Kongsberg EM712 (40-100 kHz) (3 – 1800 m)
- Kongsberg EM304 (30kHz nominal; 26-34 kHz operating) (100-8000 m)

#### Acoustic Doppler Current Profilers

- Teledyne Workhorse 300 kHz (range up to 150m)
- Teledyne Ocean Surveyor 75 kHz ( range between 400-500 m for high precision mode)

#### Split Beam Echosounders

- Simrad Kongsberg EK80 (18, 36, 70, 120, 200, 333 kHz)

#### Sub-bottom Profilers

- Knudsen Chirp 3260 Sub-Bottom Profiler (3.5 and 12 kHz) (20-30 m below seafloor)

#### APOS (Acoustic Positioning Operator Station)<sup>1</sup>

- HIPAP 502 – High precision acoustic positioning system
- HIPAP 602 - High precision acoustic positioning system for deeper waters (aprox. range from 100 to 7000m)

### **Metal Shark (Shallow water survey – up to 500m depth)**

#### Multibeam Echosounders

- Kongsberg EM2040C MKII dualhed<sup>2</sup> (200 – 400 kHz)
- Simrad Kongsberg WBT-Mini EK80 (two –transceivers 38 (split-beam)/200 (single beam) & 120 kHz)
- Velodyn Puck topographic LiDAR

### **Argus ROV**

- Multibeam Echosounder
- Reson Seabat T-50S (Dual frequency multibeam – 200 and 400 kHz)

### **Maritime Robotics USV Otter (Shallow Water Mapping)**

#### Multibeam Echosounders

- Kongsberg EM2040P (200 – 400 kHz)
- Velodyn Puck LiDAR
- Simrad Kongsberg WBT-Mini EK80 (two –transceivers 38 (split-beam)/200 (single beam) & 120 kHz)

<sup>1</sup>Acoustics for subsea positioning (ROV and submersibles). From Kongsberg Maritime AS "The HiPAP systems are designed to provide accurate positions of subsea objects such as Remotely Operated Vehicles (ROVs), autonomous underwater vehicles (AUVs), towed bodies or fixed seabed transponders."

<sup>2</sup>Dual head – in Metal Shark there are 2 transducers EM 2040C MK II heads that work together as one so within one.

## R/V OceanXplorer Support Vessels

### Metal Shark 38

|          |                           |
|----------|---------------------------|
| Length   | 11.6 m/38.05 ft           |
| Capacity | 6 pax (sleep)             |
| Speed    | 30 knots (load dependent) |
| Range    | 300 nm (load dependent)   |



- Fitted with two 50-liter compressed air tanks and removable compressor
- Small galley with microwave, sink refrigerator
- A/C and heat
- Head with shower
- Water maker
- Jet anchor propulsion (to enable vessel to maintain position)
- Sea Keeper stabilizer system
- Ability to fit and operate side scan sonar
- davit capable of lifting 500lb
- A-Frame capable of lifting 1000lb
- Equipped with Kongsberg EM2040C Multibeam Echosounder for habitat and bathymetry mapping objectives between 20-300 m water depth
- Equipped with Kongsberg WBT-Mini Spli-Beam Echosounder for water column mapping objectives between 20-300m water depth (200kHz/38kHz, 120 kHz)
- Starlink Internet capability



### Zodiac Milpro Mk 6 HD (x2)

|             |                          |
|-------------|--------------------------|
| Length      | 7 m /23 ft               |
| Capacity    | 20 pax*                  |
| Engine      | Yanmar Dtorque 111L 50HP |
| Max payload | 4,100 kg                 |

\*absolute maximum, capacity significantly reduced with gear

### Ribeye Tender

|                |                                  |
|----------------|----------------------------------|
| Length         | 7.2 m / 24 ft                    |
| Capacity       | 10 pax                           |
| Inboard engine | Yanmar 4LV 250; Hamilton Jet 241 |
| Max speed      | 32-34 (w/ 3 pax)                 |



## R/V OceanXplorer Vehicles

### **Triton 3300/3 Submersibles (x2)**

|                |                                           |
|----------------|-------------------------------------------|
| Classification | DNV 1A UWT Submersible (Autonomous)       |
| Registration   | British Registry Submersible Vessel       |
| Depth          | 1,000m / 3,280ft                          |
| Payload        | 800kg / 1,760lb                           |
| Capacity       | Pilot + 2 Pax                             |
| Speed          | 1.54mps / 3kts                            |
| Endurance      | 12 - hours Normal<br>96 - hours emergency |



- Science equipment including:
  - Hydraulic manipulator
  - Bio suction sampler
  - CTD sensor
  - RTD Temperature Probes
  - Scaling lasers
  - Niskin Bottles (for water sampling)
  - Core Samplers
  - Clove Oil Guns
  - LED optical lure
- Full suite of camera equipment including:
  - RED 8k cameras
  - Ultra low light cameras
  - 30,000 lumen LED lights
  - Blue fluorescent illumination
  - Red illumination
  - Optical modem for live streaming (requires CTD or ROV deployment)



### **Argus Mariner XL ROV**

- 6000m rated
- 100hp Work Class vehicle
- Electric Propulsion (8 Thrusters)
- HPU for 2 x Manipulators
- HPU for Tooling
- Cameras including RED 5k, Argus4K ultra low light, 360 Rig, Photogrammetry Rig, Cathx hispeed with Strobes
- 12 x LED lights (white and red light options)
- Acoustic Camera
- Skid with 8 x pot bio sampler and hydraulic Bio Box
- Reson T50 dual head Multibeam (200 & 400Khz)
- RBR CTD Sensor array

### **Mini Argus Mariner ROV**

- 6000 m rated
- OBS class ROV 3kW
- Electric Propulsion (6 Thrusters)
- Scanning Sonar, Altimeter and Depth sensor
- Spare Ethernet port
- Plug and play manip port
- Cameras including Argus 4K and SD obs
- 2 LED lights



## R/V OceanXplorer Vehicles (continued)

### Otter Pro USV – Unmanned Surface Vehicle

Dimensions: 200 cm x 108 cm x 106.5 cm; 78.7" x 42.5" x 41.9"  
Draft: 32cm; 12"  
Capacity: 0 pax  
Speed: 1-3 kn  
Endurance: 9hrs at 3Kn - 28hrs at 1Kn

- Material: Polyethylene
- Weight: 65kg/143lbs
- 2x geared electric motors
- Standard Equip: SeaSight CL (360 camera and Lidar for collision avoidance & visual control); Positioning System (Kongsberg Seapath 30-50 INS); AutoCast SVP winch (AML-3 Hydro CTDSV 500)
- Payloads: Lidar (Velodyne Puck (VLP-16) & Multibeam (Kongsberg 2040P w AML SV USV PU), Kongsberg WBT-Mini (200kHz.38kHz, 120 kHz), Cubert Ultras X20 Hydrospectral camera



## R/V OceanXplorer Aerial Assets

### Airbus AS350 B3e Helicopter (H125)



|                    |                              |
|--------------------|------------------------------|
| Tail Number        | N988MD                       |
| Pilots             | Licensed by the U.S. FAA     |
| Useful load        | 976 kg / 2,151 lbs.          |
| Capacity           | 1 pilot + up to 5 passengers |
| D Value            | 12.94 m / 42.45 ft           |
| Maximum speed      | 155 knots                    |
| Cruising speed     | 137 knots                    |
| Range              | 349 nm.                      |
| Range (Over Water) | Approx. 50 nm.               |
| Endurance          | 4 hrs. (with full fuel)      |
| Sling load max     | 998 Kg / 2,200 lbs.          |
| Cargo Pod load max | 120 kg / 265 lbs             |

- Full Emergency Litter Kit
- Ferry Tank
- Air Film Camera mount (AFSP-1 Single Pole)

### DJI Mavic Pro 2 with Dual Enterprise (unmanned aerial vehicle – scientific drone)

- Resonon Hyperspectral Camera (Pika XC2, 400-1000nm range)
- Flight time: ~30min

R/V OceanXplorer Aerial Assets (continued)

DJI Matrice M600 Pro UAV (unmanned aerial vehicle – scientific drone)

- DJI Zenmuse X5 w25mm lenses and Ronin Gimbal
- Flight time: 10-25min



UAVOS UVH 25EL (scientific drone)



| PARAMETER                                   | DATA                              |
|---------------------------------------------|-----------------------------------|
| Cruising speed                              | 45 km/h (28 mi/h)                 |
| Maximum speed                               | 100 km/h (62 mi/h)                |
| Max. Payload                                | 5 kg (11 lb)                      |
| MTOW                                        | 25 kg (55 lb)                     |
| Max. climbing capacity                      | 3 m/s (5.8 kts)                   |
| Max. wind speed while taking off or landing | 14 m/s (27kts)                    |
| Endurance                                   | 1.5 h                             |
| Operational range                           | 67 km (41.6 mi)                   |
| Practical ceiling                           | 3,500 m (9,842 ft)                |
| Operation temperature                       | -20°C to +40°C (-4°F to + 104 °F) |

| PARAMETER                      | DATA                                                                                                         |
|--------------------------------|--------------------------------------------------------------------------------------------------------------|
| Main rotor diameter            | 2,600 mm (102.3 in)                                                                                          |
| Length                         | 2,670 mm (105.1 in)                                                                                          |
| Height                         | 670 mm (26.3 in)                                                                                             |
| Landing skids base             | 790 mm (31.1 in)                                                                                             |
| Engine type                    | BLDC Electric                                                                                                |
| Motor power                    | 5 kW                                                                                                         |
| Battery                        | Li-Ion                                                                                                       |
| Emergency landing              | Parachute/Autorotation                                                                                       |
| Onboard power supply           | 12 V                                                                                                         |
| Altimeter                      | Radio                                                                                                        |
| TBI (inspections, maintenance) | 500 h                                                                                                        |
| Level surface                  | 10 x 10 m                                                                                                    |
| Storage                        | Heli in box: 42 kg (92.6 lb)<br>Packing dimensions: 1,700 mm x 300 mm x 500 mm (66.9 in x 11.8 in x 19.6 in) |
| Ground support equipment       | Not required                                                                                                 |

www.uavos.com  
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DJI Mavic 3 Pro UAV (unmanned aerial vehicle – media drone)

- 4/3 CMOS Hasselblad Camera
- Dual Tele Cameras
- Tri-Camera Apple Pro Res Support
- Omnidirectional obstacle sensing
- 43-minute maximum flight time
- 15 km HD video transmission

