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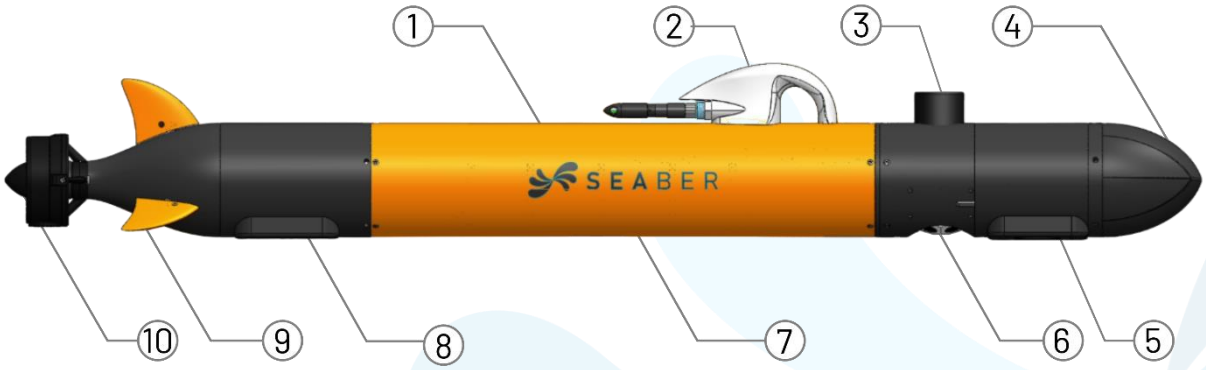
Datasheet

MARVEL-LUMEN

This document provides further information on the MARVEL-LUMEN *key features.*

MARVEL-LUMEN is equipped with an underwater camera from *Arctic Rays*, for imaging acquisition that features geo-referenced digital capture of both still images and video. It comes with a DVL, to compensate current drift, improve positioning and keep altitude from the sea floor. It can be equipped with underwater acoustic positioning and communication module.



1	Start key and charging port	6	DVL (Doppler Velocity Logger)
2	Mast (UHF radio communication, GNSS antenna and status LEDs)	7	Sealed dry body section which contains Lithium-Ion battery and electronics
3	Acoustic positioning and communication module *(in option)*	8	Lighting
4	Nose (wet part for buoyancy foam and payloads)	9	Fins
5	Underwater camera	10	Propulsion Thruster

Technical features

Length	110 cm
Body Diameter	12 cm
Weight in air	10 kg
Depth rating	300 m
Speed	2 to 6 knots
Endurance	10 hours @ 3 knots / 6 hours @4 knots (with Li-Ion battery)
Navigation accuracy	<5m absolute positioning within USBL surface module range
Energy	Rechargeable 600Wh/14.8V Li-Ion
Battery Charger	100 to 240 VAC 50 to 60 Hz
Programming interface	SEAPLAN software by SEABER
Surface Communication	LoRa UHF point-to-point communication with SEACOMM device For MARVEL status messages and orders Autonomous buoy with USBL unit and dual antenna GNSS-RTK module
Underwater Communication	Real-time status of the MARVEL with acoustic modem Possibility to send orders to the MARVEL during the mission
Accessories	Rugged transport case Spare parts and tools in waterproof bag

Sensors

DVL	
Model	Waterlinked A50
Frequency	1 MHz
Beam angle	22.5 degrees
Ping rate	4-26 Hz
Max altitude	50 meters
Max velocity	3.75 m/s
Velocity resolution	0.1 mm/s

Imaging payload			
Model		Arctic Rays SwordFish	
OPTICAL		LIGHTING	
Imaging type	Single camera, stills and video	Integrated Lighting	4x fixed dual-mode LED arrays
Camera Sensor	Sony IMX304, 12.3 MP, 1.1 in. format, back-illuminated color CMOS with global shutter	Color Temperature	5,70K, 70 CRI minimum standard
Camera Lens	12 mm f/2.8 rectilinear, low distortion (-0.5%)	Output Lumens	60,000 Lm in strobe mode; 6,000 Lm in torch mode
Still Image Resolution	4,096 x 3,00 (12.3 MP)	Beam Angle	100°
Still Image Rep Rate	4 Hz max, full-res standard	Strobe Pulse Duration	5 ms max standard
Video Modes	720p HD @ 60 fps; 1,080p FHD @ 30 fps; 4K UHD @ 10 fps	Strop Rep Rate	2 Hz max standard; 4 Hz optional
Angle of view	71° in air; 51° in water	Torch Dimming	0-100% in 1% increments
Field of view	Approx. 96% of altitude in water		
Imaging Altitude	3-5 m recommended		

Acoustic positioning and communication module	
Model	Blueprint SeaTrac
Acoustic Range	1km radius horizontal, 1km vertical (hemispherical)
Range Resolution	±0.1m (dependant on provided VOS accuracy)
Velocity of Sound Range	1300ms-1 to 1700ms-1 (can auto-compute from water temp & depth)
Beacon Velocity	Active Doppler compensation, up to 15kts (28kph)
Communications	Broadband spread spectrum encoding, 24-32kHz, 100 baud. Multi-tiered Acoustic Protocol Stack.