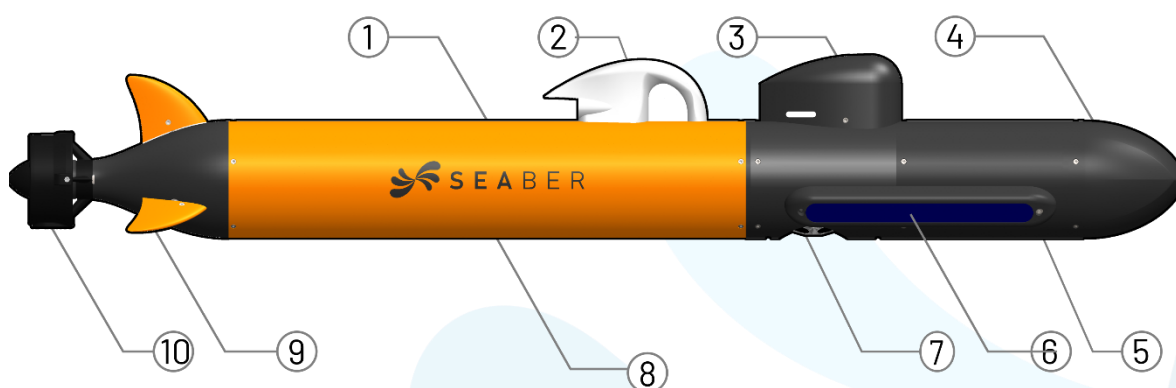


# Datasheet

## MARVEL-SCAN-MAG

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

**MARVEL-SCAN-MAG** is equipped with a mono or dual frequency Side-Scan Sonar from *Marine Sonic*, producing seabed scan images. It is also equipped with a magnetometer sensor from *Applied Physics*, detecting magnetic anomalies. It comes with a DVL, to compensate current drift, improve positioning and keep altitude from the sea floor. It is equipped with underwater acoustic positioning and communication module.



1 Start key and charging port

6 Side-scan sonar transducers 600kHz, 1200kHz, 900kHz or 1800kHz or dual 600/1200kHz or 900/1800kHz

2 Mast (UHF radio communication, GNSS antenna and status LEDs)

7 DVL (Doppler Velocity Logger)

3 Acoustic positioning and communication module

8 Sealed dry body section which contains Lithium-Ion battery and electronics

4 Nose (wet part for buoyancy foam and payloads)

9 Fins

5 Applied Physics Navigation Model 1540

10 Propulsion Thruster

## Technical features

Length	130 cm
Body Diameter	12 cm
Weight in air	11,5 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

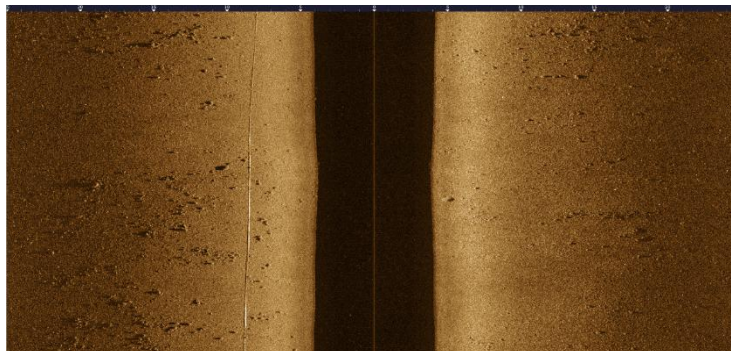
## Sensors

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

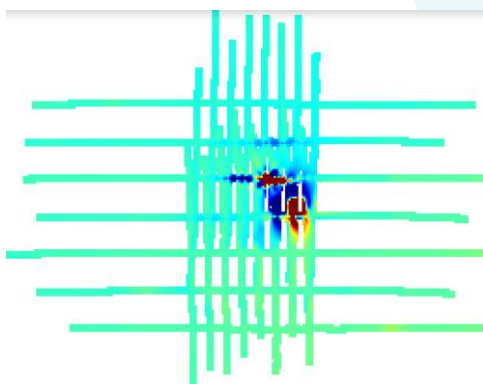
Side Scan Sonar	
Model	Marine Sonic Sea Scan ARC ° Scout Mk II
Frequency	Single Frequency: 600kHz, 1200kHz, 900kHz or 1800kHz Dual Frequency: 600kHz/1200kHz or 900kHz/1800kHz
Range	Up to 140m (600kHz), 45m (1200kHz) Up to 80m (900kHz), 25m (1800kHz)
Horizontal Beam Angle	0.4° (one-way), <0.3° (two-way)
Vertical Beam Angle	24° (two-way)
Output file format	SDS (Marine Sonic Format) XTF (eXtended Triton Format)

Magnetometer	
Model	Applied Physics Navigation Model 1540
Mesurement range	$\pm 6.5 \times 10^4$ nT ( $\pm 0.65$ G)
Accuracy	$\pm 0.5\%$ full-scale
Resolution	0.03 nT (0.0003 mG)
Noise level	$\pm 0.5$ nT ( $\pm 5$ $\mu$ G) peak-to-peak

Acoustic positioning and communication module	
Model	Blueprint SeaTrac
Acoustic Range	1km radius horizontal, 1km vertical (hemispherical)
Range Resolution	$\pm 0.1$ m (dependant on provided VOS accuracy)
Velocity of Sound Range	1300ms <sup>-1</sup> to 1700ms <sup>-1</sup> (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.



(35mm telecom cable survey)



(magnetic map of the shipwreck after calibration)