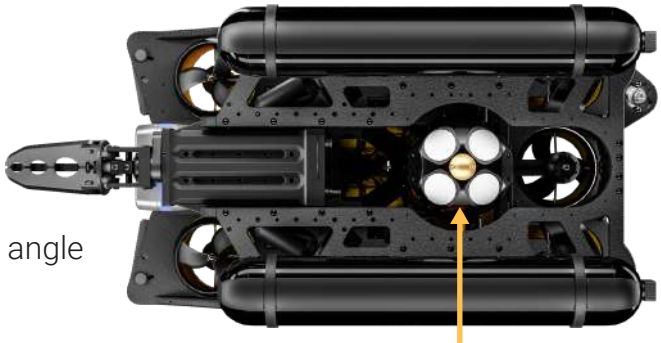
PRODUCT DATA SHEET

Defender Deep Water System Navigation Package

The Defender Deep Water System Navigation Package enhances autonomous control at depths up to 1,000m. It includes a Doppler Velocity Log (DVL) for tracking the ROV's position along the sea bottom and estimating distance traveled using "dead reckoning" navigation. A GPS antenna corrects the position at the surface. The software upgrade integrates these sensors, offering station keeping, mission planning, dynamic positioning, and data export. A USBL system can be added for operations beyond the DVL's range.

DVL SPECIFICATIONS

Depth Rating	4km
Frequency of Operation	500kHz
Beam Width	2.9 degrees
Configuration	4-beam Janus array convex transducer, 25 degree beam angle
Minimum Altitude	0.1m
Maximum Altitude	100m



GPS SPECIFICATIONS

Depth Rating	1,000m
Horizontal Position Accuracy	2.5m
Time-to-first-fix	29s
Sensitivity	-166 dBm

GREENSEA IQ UPGRADES

- **Station Keeping**
- **Reacquisition**
- **Mission Planning**
- **Dynamic Positioning**

**This is only the navigation portion of the Deep Water system. A Deep Water float block, Subsea Batteries, and fiber tether are required for the vehicle to reach 1,000m depth. An optional 1,000m rated Sonar is also available.*

USBL (OPTIONAL)

Depth Rating	1000m
Acoustic Range	1 km radius horizontal, 1km vertical
Range Resolution	±50mm
Velocity-of-Sound Range	1300ms-1 to 1700ms-1
Becaon Velocity	Active Doppler compensation, up to 15kts (28kph)
Communications	Broadband spread spectrum encoding, 24-32kHz, 100 baud. Multi-tiered Acoustic Protocol

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