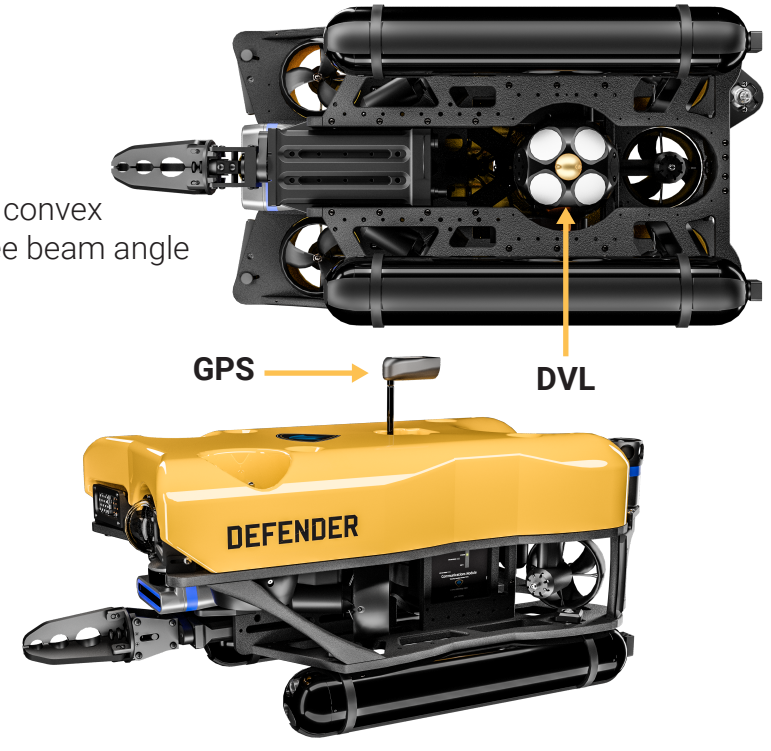
PRODUCT DATA SHEET

# 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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