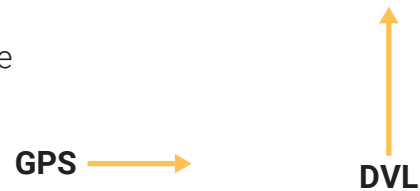


Mission Specialist Defender Navigation Package

The Mission Specialist Navigation Package enhances autonomous control. It integrates 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 seamlessly integrates these sensors, offering station keeping, mission planning, dynamic positioning, and data export. A USBL system can be added for missions beyond the DVL's range.

DVL SPECIFICATIONS

Depth Rating	300m
Frequency of Operation	500kHz
Beam Width	2.9 degrees
Configuration	4-beam Janus array convex transducer, 25 degree beam angle
Minimum Altitude	0.2m
Maximum Altitude	100m



GPS SPECIFICATIONS

Depth Rating	300m
Horizontal Position Accuracy	2.5m
Time-to-first-fix	29s
Sensitivity	-166 dBm

GREENSEA UPGRADES

- Station Keeping
- Reacquisition
- Mission Planning
- Dynamic Positioning

USBL(OPTIONAL)

- Depth Rating**
- Acoustic Range**
- Range Resolution**
- Velocity-of-Sound Range**
- Becaon Velocity**

Communications

300m
1 km radius horizontal, 1km vertical
±50mm
1300ms-1 to 1700ms-1
Active Doppler compensation, up to 15kts (28kph)
Broadband spread spectrum encoding, 24-32kHz, 100 baud. Multi-tiered Acoustic Protocol