

# Synapse

## Horizontal Transverse Gradiometer



### Smarter, Smaller, Faster, *Better.*

Synapse H-Grad offers automatic configuration, coordination, synchronization and self-diagnostics. It can't set up and deploy itself, so we made it light and small.

Work smarter, not harder.

#### Fast Sampling

Microcell Rubidium sensors offer **up to 20Hz** sampling with ultra-low 10pT/rt-hz sensitivity.

#### Ultra-Light

At **21.8 kg (48 lbs)** the combined frame and two nodes can be deployed by one person.

#### Simple Assembly

Assemble in as little as **30 minutes**.

#### Time Synched Precision

**Synapse** automatically synchronizes its nodes to within microseconds.

#### Integrated position tracking

**Synapse** can be equipped with built-in IMU, Altimeter, and Pressure sensor options—no messy straps/attachments.

#### Rough Weather Resistance

Maintain control with the **self-righting frame**.

### Ultimate Versatility

A lightweight, low-drag, neutrally-buoyant gradiometer for any application and deployment: conventional or unmanned surface, underwater (AUV, ASV, USV) or Side Scan sonar integrations.

# Specifications

## Performance

Operating Zones	Worldwide
Absolute Accuracy	TBD
Sensor Sensitivity	10 pT/rt-Hz
Resolution	1 pT
Dead Zone	1 Zone (+/- 6 degrees from center) <i>Sensor can be easily rotated for worldwide operation</i>
Sampling Rate	Up to 20hz
Sensor Type	Scalar (Rubidium optically-pumped)
Power Consumption	4.5 W per node
Range	18,000 nT to 120,000 nT
Gradient Tolerance	Over 10,000 nT/m
Interface	USB or RS232
Power Supply	24 VDC (120-240 VAC compatible) (Acceptable range 9-30 VDC)

## Magnetometer

Length	86 cm (33.75 in) 94 cm (37 in) w/ altimeter
Diameter	7.6 cm (3 in)
Weight in Air	3.5 kg (7.7 lbs) 4.7 kg (10.4 lbs) w/ altimeter
Weight in Water	Neutral
Depth Rating	1000 m (1420 psi)

## Gradiometer Self-righting Frame

Span	1.5m (59 in)
Height	65 cm (26 in)
Weight in Air	12.4 kg (27.3 lbs)
Weight in Water	Neutral
Depth Rating	300 m (426 psi)

## Y-Split Tow Cable

Length	4.2 m (13.8 ft), Customizable
Weight in Air	1.4 kg (3.1 lbs)
Weight in Water	Neutral

## Side Scan Sonar Integration Cable

Length	5.2 m (17.1 ft), Customizable
Power Consumption	9-40VDC
Weight in Air	4.5 kg (9.9 lbs)
Weight in Water	0.15 kg (0.3 lbs) <i>Total weight including sidescan mechanical tow point: 3.0 kg (6.6 lbs) in fresh water</i>

## Neutrally buoyant system consists of:

### Synapse Nodes

- Scalar Magnetometer sensor
- Network Status LED
- Leak Detector
- *Optional: Integrated support sensors*

### Support Sensors

- **Altimeter (optional):** Narrow beam 200 kHz, 0.01 m resolution, 100 m range
- **Tilt IMU (optional):** Full Euler-angle attitude solution, 0.01° resolution (pitch, roll, yaw)
- **Pressure/Depth sensor (optional)**

### Gradiometer Frame

- Lightweight anodized aluminum streamlined frame
- Self-righting keel and float
- *Optional: Heavier frame available for surface-towed applications*

### Additional Components

- Isolation Transceiver
- Side Scan Integration + Interface cables
- Y-split tow cable (with Integrated transceiver for AUVs)
- AUV tow cable
- Custom reusable shipping case