

Introducing the SeaTrac series of Micro-USBL tracking and data modems. Built around a robust broadband spread spectrum signalling scheme, these multi-purpose acoustic transponder beacons are capable of simultaneously tracking asset positions and undertaking bi-directional data exchange.



SeaTrac X010



SeaTrac X110



SeaTrac X150

reattempting transmission in event of packet loss.

Use of the X150 USBL beacons will allow the interrogating end of the link to obtain a relative position of the remote modem during data exchange, while X010 & X110 beacons will provide distance between modems.

Integrated beacon sensors (such as depth, attitude and supply voltage) may also be remotely queried by the interrogating modem.

## Position Tracking

When used in a tracking application, one X150 is mounted from the supervisor vessel, and connected to a PC running the SeaTrac NavPoint display and logging software. All positions are computed by the X150 beacon, so no additional PC hardware is required.

Sub-surface assets to be tracked (including Divers, ROV's, AUV's etc) are fitted with an X010 or X110 beacon, and optionally may use the data port to provide periodic acoustic communications with other systems and sensors.

In this mode up to 14 other beacons may be tracked at ranges up to 1km from the supervisor, with the position of each being optionally broadcast to others in the network.

## Data Modems

In a modem application, beacons are mounted at either end of the required data links and addressable packets of data are exchanged between the Acoustic Communication Stacks using protocols that ensure integrity of data, buffering and

## AHRS

Each beacon is fitted with a 9 Degrees-of-Freedom (DOF) Attitude and Heading Reference System, taking data from the onboard MEMS gyroscope, accelerometer and magnetometer to produce pitch, roll and yaw information that is made available to external applications via the communications port.

## Applications

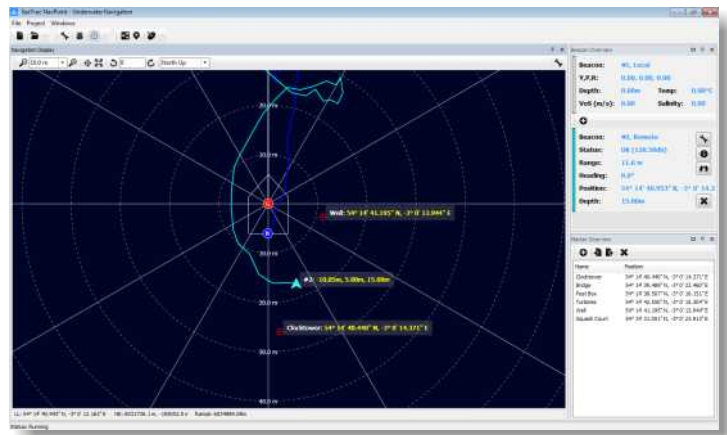
- Multi-beacon tracking system (for small to medium ROVs, AUVs, Divers etc).
- Remote control and interrogation of sub-sea equipment
- AUV/Diver telemetry links
- Remote depth, attitude and orientation measurement.



## NavPoint

NavPoint is a Windows software application that allows users to track up to 14 underwater assets, each fitted with a SeaTrac acoustic beacon, from a single USBL beacon.

NavPoint has a variety of features to help users perform positioning, navigation and survey tasks, including the logging and playback of operational data, interfaces to satellite positioning systems, geographic markers, waypoint and destination navigation information and real-time data output to other NEMA compatible systems.



## Specifications

Mechanical	SeaTrac X150 BP00795	SeaTrac X110 BP00843	SeaTrac X010 BP00977
<b>Length</b>	132mm (5.2") exc con 160mm (6.3") inc con	106mm (4.2") exc con 134mm (5.3") inc con	74mm (2.9")
<b>Diameter</b>	54mm body, 59mm cage		
<b>Weight</b>	720g in air 530g in water	690g in air 500g in water	300g in air 170g in water
<b>Depth Rating</b>	100m, 300m, 1000m, 2000m		300m
<b>Construction</b>	316 Stainless Steel and Black ABS plastic		
<b>Operating Temp Range</b>	-5°C to +40°C (23°F to 104°F)		

### Electrical

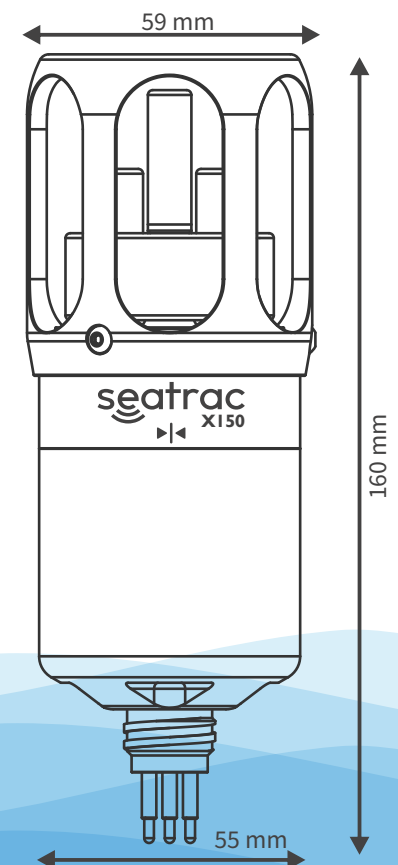
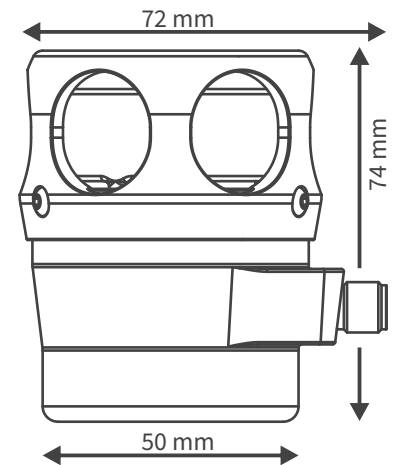
<b>Connector</b>	Teledyne Impulse MCBH-5-MP (5-way) or MCBH-8-MP (8-way)	Teledyne Impulse IE55 (4-way)
<b>Communications</b>	Single RS-232 as standard (5-way connector) Optional second 'AUX' RS-232 (8-way connector)	Single RS-232
<b>Supply Voltage</b>	9-28VDC	
<b>Power Consumption</b>	approx 0.6W when idle, approx 6W when transmitting	
<b>Integrated Sensors</b>	Water Pressure & Temperature, 3-axis MARG, Supply Voltage	
<b>Attitude &amp; Heading</b>	Internal 9-DOF AHRS with ±1° Yaw & ±0.2° Pitch & Roll std-deviation *	

### Acoustic

<b>Ranging</b>	Yes	Yes	Yes
<b>Positioning (USBL)</b>	Yes	No	No
<b>Acoustic Range</b>	1km radius horizontal, 1km vertical (hemispherical)		
<b>Range Resolution</b>	±0.1m (dependant on provided VOS accuracy) *		
<b>Angular Resolution</b>	typ 2% of Acoustic Range * (~±1°)	N/A	N/A
<b>Velocity-of-Sound Range</b>	1300ms <sup>-1</sup> to 1700ms <sup>-1</sup> (can auto-compute from water temp & depth)		
<b>Beacon Velocity</b>	Active Doppler compensation, up to 15kts (28kph)		
<b>Communications</b>	Broadband spread spectrum encoding, 24-32kHz, 100 baud. Multi-tiered Acoustic Protocol Stack.		
<b>Targets (Addressing)</b>	15 unique beacon identifiers, broadcast to all capability. Allows up to 14 targets to be tracked from a single X150 USBL beacon.		

### Applications

<b>Supported Software Platforms</b>	SeaTrac NavPoint Software SeaTrac Beacon Management Software
<b>Developers/Integrators</b>	SDK, including ASCII based serial interface with Application level and Acoustic Protocol Stack level commands for third party integration.



\* indicates value obtained from in-field testing with a data set of 1200 fixes from 22 positions, taken in enclosed area of water 380m x 160m x 10m. Please note that all functions & specifications may be subject to change in line with our policy of continual product development.

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