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Datasheet

HPT 3000 Ultra-Short BaseLine Transceiver

Description

The HPT 3000 Ultra-Short BaseLine (USBL) is a new smaller, lighter, high performance Ethernet interfaced transceiver supporting Sonardyne's Wideband®2 6G® instruments.

This smaller HPT offers significant improvements for survey positioning for coastal and near shore operations where high elevation tracking is required in low noise environments.

The advanced multi-element processing enables transponders to be positioned more precisely, more quickly and more robustly due to improvements in signal processing algorithms. When used as part of a complete Mini-Ranger 2 USBL system, heading and inertial navigation sensor, class leading performance is achieved.

The internal MTi-30 Xsens sensor provides pitch, roll and heading data for search and salvage applications which are time critical, requiring turn on and track functionality. Shallow water operations and pipelay from anchor barges also benefit from the internal sensor being calibration free.

'Discovery Mode' enables users to automatically detect previously deployed transponders including their configured address and channel, making the system easier to use.

The HPT 3000 is a highly capable acoustic transceiver. Its multiple simultaneous channels enable robust tracking of 10 targets.

Manufactured in Aluminium Bronze, the HPT 3000 is intended to be fitted temporarily or permanently to a vessel's through-hull or over-the-side pole.

The full hemispherical coverage optimises performance in shallow water environments boosting transmissions and receive sensitivity in the horizontal axis.

Ethernet connectivity enables the system to function over existing ship network wiring for rapid installation.

Key features

- High performance USBL transceiver utilising Wideband®2 ranging and telemetry offer improved USBL precision and robustness
- Enhanced USBL array design for shallow water high elevation tracking.
- Internal "Xsens" sensor magnetic compass for quick operation.
- True simultaneous tracking of multiple transponders providing high update rates
- Built in health checks including array and electronics diagnostics
- Discovery mode allows users to automatically scan for transponders deployed within acoustic range
- Waterfall plot for enhanced ambient noise monitoring.
- Audio codec for live streaming. To allow noise and signals to be heard in the water.
- Compatible with the Sonardyne 6G suite of products.
- Ethernet connectivity using an Ethernet Serial Hub (ESH)
- Upgradable to LBL and Modem

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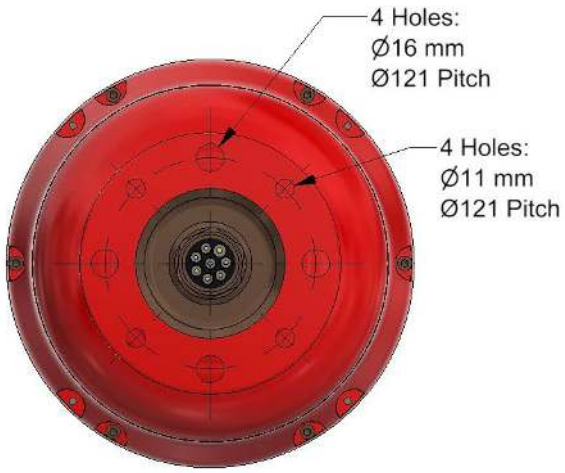
Specifications

HPT 3000 Ultra-Short BaseLine Transceiver



Feature		Type 8212
Operational Frequency		MF (19–34 kHz)
Transceiver Performance	Operating Range	Restricted to 995 m with MiniRanger 2 system (4000 m with Extended Range version)
	Acoustic Cover	Full 180 degrees.
	Range Precision	Better than 15 mm
	Positioning Repeatability External MRU	All Transceivers tested to better than 0.2% of Slant Range 1 Drms / 0.14% 1 Sigma
	Positioning Repeatability Internal Xsens Pitch and Roll.	All Transceivers tested to Better than 1.3% of Slant Range 1 Drms / 0.9% 1 Sigma
Transmit Source Level	SL = dB re 1 uPa @ 1 m	194 dB
	Tone Equivalent Energy (TEE)*	200 dB (3 JA)
Electrical		48 V dc (±10%), Typical 15 W, Max 120 W
Communication		Ethernet 100 Mbps
Operating Temperature		-5 to 40°C
Storage Temperature		-20 to 45°C
Mechanical Construction		Aluminium Bronze
Dimensions; Height x Diameter		310 x 234 mm
Weight in Air/Water		19.4/9.5 kg

Note: The absolute accuracy of the system is dependent upon the quality of external attitude and heading sensors, beacon source level, vessel noise, water depth, mechanical rigidity of the transceiver deployment machine, SV knowledge and proper calibration of the total system using CASIUS.

*TEE – WBv2+ signals are 4x the duration of Sonardyne tone signals (WBv1 & WBv2 are 2x). The TEE figure shows the operational performance when comparing wideband and tone systems.

Detection performance is directly related to the signal energy (Joules (Watt seconds)) and not power. WBv2+ signals are longer in duration (greater energy) than WBv1 and Tone, therefore the detection performance is the same or improved for low transmit source levels.

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Datasheet

Wideband Sub-Mini 6 Plus (WSM 6+) Transponder/Responder

8370-4112
Directional

8370-1111
Omni-Directional

Description

The Wideband Sub-Mini 6 Plus (WSM 6+) is Sonardyne's latest generation of versatile USBL transponders/responders that support WBv2 signals. The WSM 6+ is designed for positioning ROVs, towfish and other mobile targets in water depths up to 4,000 metres.

The compact and rugged design is based on the field proven WSM mechanics and is available in MF Directional and MF Omni-Directional versions. The latest Sonardyne Wideband®2 signal technology has been incorporated, which offers superior ranging accuracy and fast USBL position updates.

The WSM 6+ improves on its predecessors by offering full two-way Wideband support – interrogation and reply signals. All Wideband V2 and V2+ signals are supported. Legacy support is also available for WBV1 and HPR 400. The configuration is programmable using supplied software and a serial link or it can be configured acoustically via iWAND.

This allows the WSM 6+ to be configured for use with all of the popular MF frequency acoustic navigation systems.

The Type 8370-1111 WSM 6+ is equipped with an Omni-directional transducer and is depth rated to 1,000 metres making it suitable for a wide range of general USBL tracking applications.

The Type 8370-4112 WSM 6+ is a 4,000 metre rated unit and features a higher power directional transducer.

Both types of WSM 6+ have a depth sensor fitted as standard to aid USBL positioning accuracy and an external on/off switch to save the battery when not in use.

WSM 6+ variants are available with acoustically controlled output lines suitable for external motor drive, burnwire or contact closure releases.

Typical Applications

- Subsea vehicle tracking – ROV/towfish/crane wire
- Tether Management Systems (TMS)

Key Features

- Full two-way Sonardyne Wideband 2 interrogation and reply – mitigates interference and multi-path issues
- More than 500 unique Sonardyne Wideband 1 and 2 addresses
- Sonardyne Wideband 1 and HPR 400 navigation compatible
- Choice of 1,000 m or 4,000 m depth rating
- Choice of Omni-Directional or Directional beam-shape
- Transponder or Responder operating modes
- Depth sensor for improved USBL positioning performance
- Rechargeable NiMH battery
- External on/off switch for saving battery when not in use
- Compact and rugged design
- Release variants available

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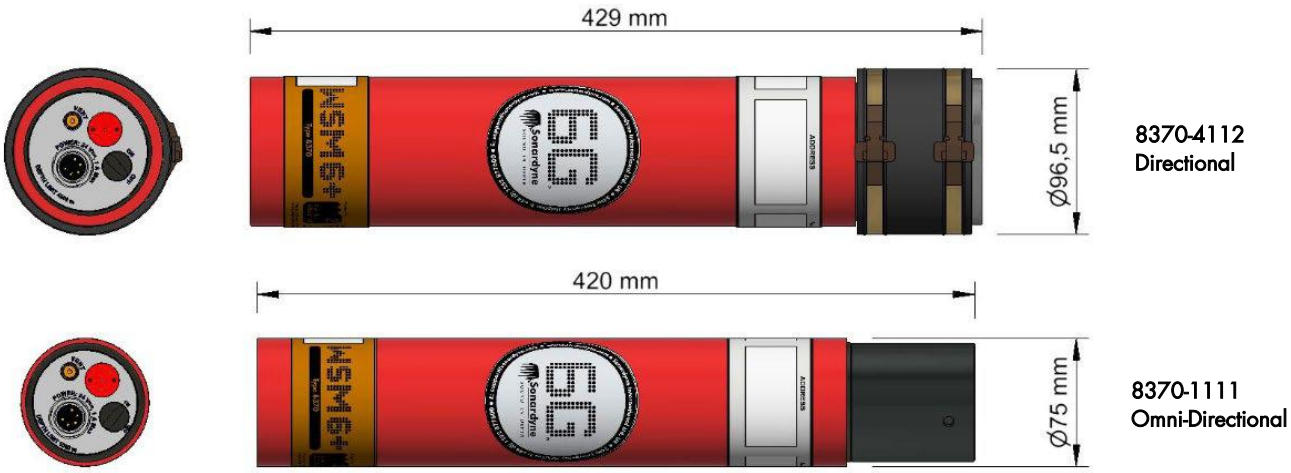
Specifications

Wideband Sub-Mini 6 Plus (WSM 6+) Transponder/Responder



Feature		Type 8370-1111	Type 8370-4112
Depth Rating		1,000 Metres	4,000 Metres
Operational Frequency		MF (19–34 kHz)	MF (19–34 kHz)
Transceiver Beamshape		Omni-Directional	Directional
Transmit Source Level	(External Power)	187 dB	196 dB
(re. 1 µPa @ 1 m)	(Battery)	184 dB	193 dB
Tone Equivalent Energy (TEE*)	(External Power)	193 dB	202 dB
Receive Sensitivity (dB re 1 µPa)		<85 dB	<80 dB
Power Supply		Rechargeable NiMH battery or ext. 24 V via ROV umbilical	Rechargeable NiMH battery or ext. 24 V via ROV umbilical
Operating Channels		All Sonardyne Wideband HPR 400 Channels	All Sonardyne Wideband HPR 400 Channels
Depth Sensor		±0.5% Full Scale (100 Bar)	±0.5% Full Scale (400 Bar)
Operating life (1 s update rate, max. power, WB2)		>6 days	>3 days
Maximum Update Rate		>2 Hz	>2 Hz
Quiescent Life (Battery)		>35 Days	>35 Days
Battery Charger		8370-011-01	8370-011-01
Connector			
5-Way (Standard)		Subconn MCBH5M	Subconn MCBH5M
8-Way (Burnwire/Motor Release)		Subconn MCBH8F	Subconn MCBH8F
Operating Temperature		-5 to 40°C	-5 to 40°C
Storage Temperature		-20 to 55°C	-20 to 55°C
Mechanical Construction		Aluminium Alloy, Anodised	Aluminium Alloy, Anodised
Dimensions (Length x Diameter)		420 x 75 mm	429 x 96.5 mm
Weight in Air/Water**		3.2 kg/1.3 Kg	5.5 Kg/3.2Kg

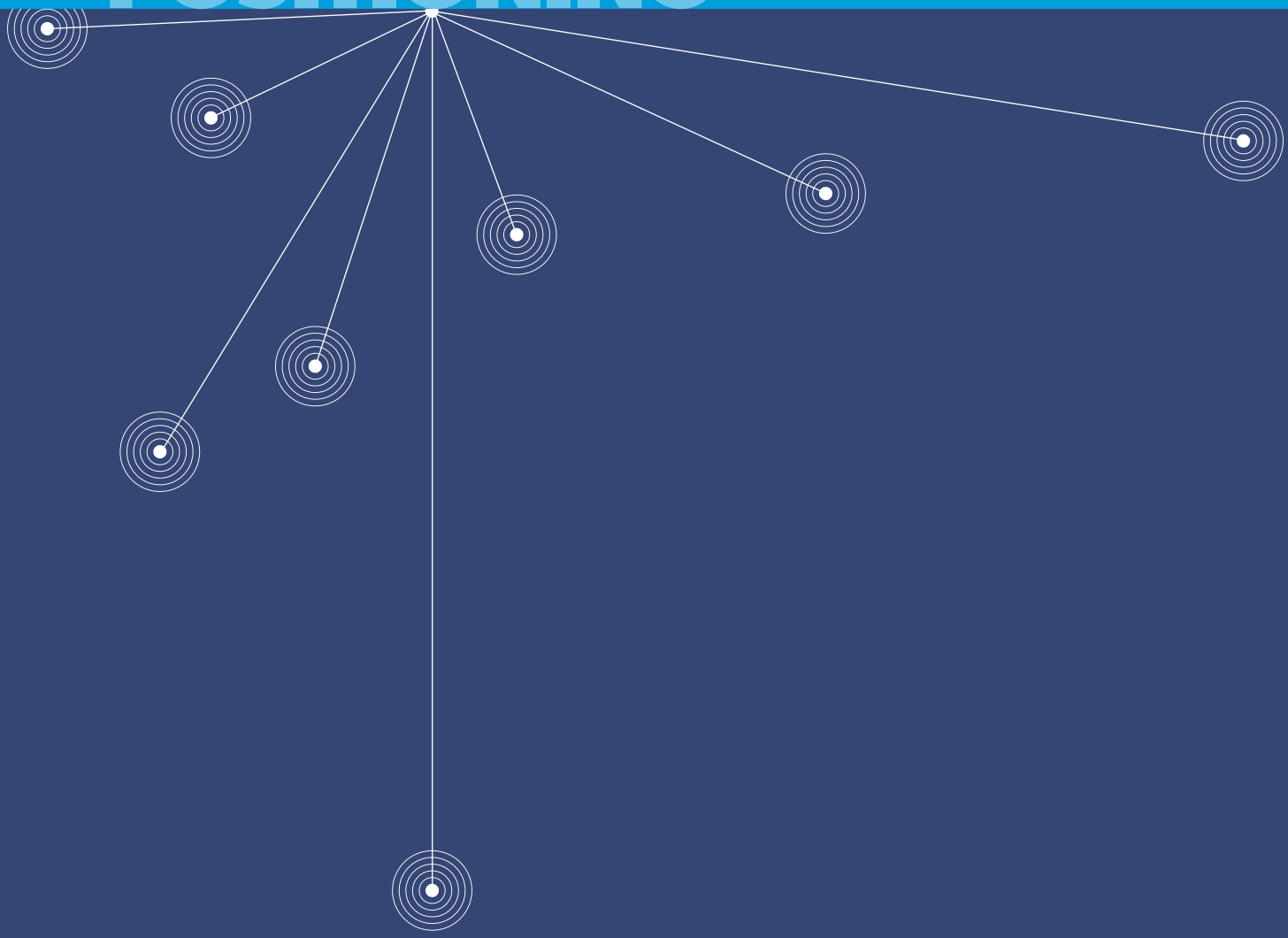
*TEE – WBv2 & WBv1 signals are 2x the duration of Sonardyne tone signals, therefore the TEE figure gives the user an idea of the operational performance when comparing Wideband and Tone systems.

**Estimated weights

Sonardyne
SOUND IN DEPTH

SUBSEA TECHNOLOGY

RANGER 2 USBL
UNDERWATER TRACKING AND POSITIONING

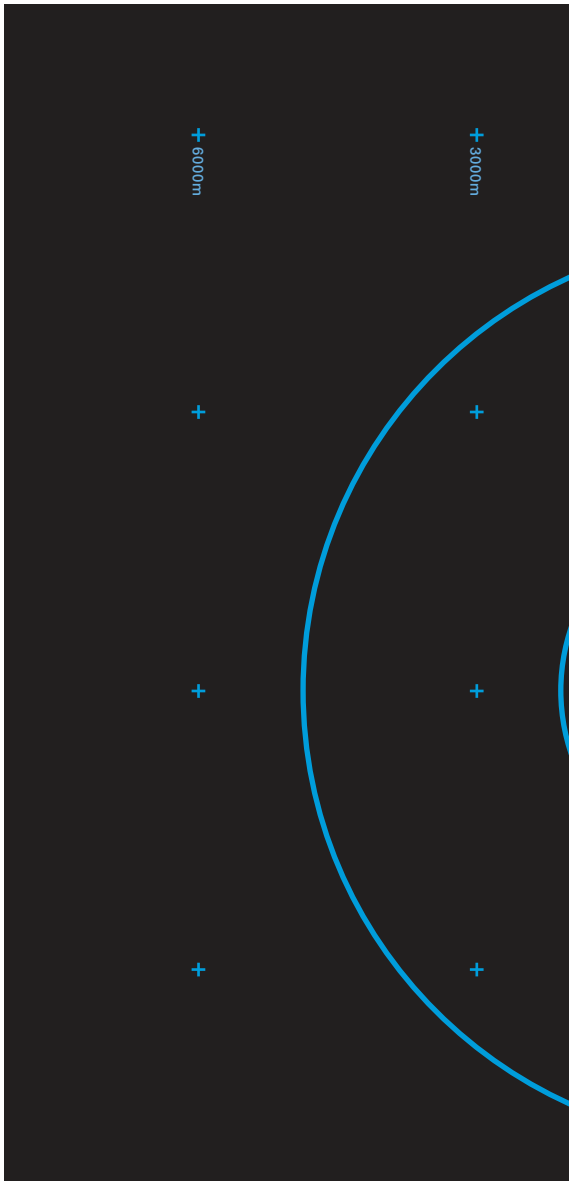


POSITIONING
NAVIGATION
COMMUNICATION
MONITORING
IMAGING

RANGER 2 USBL

TRACK EVERYTHING, IN ANY DEPTH, FROM ANY VESSEL.

TRACK A TOWFISH, POSITION AN ROV, DP YOUR VESSEL, SEARCH THE SEABED OR NAVIGATE AN AUV. WHEN YOU NEED TO INVEST IN ULTRA-SHORT BASELINE (USBL) ACOUSTIC TECHNOLOGY TO SUPPORT YOUR UNDERWATER OPERATIONS, RANGER 2 HAS THE PERFORMANCE YOU NEED, AT THE INVESTMENT LEVEL YOU CAN AFFORD TO GET THE PROJECT COMPLETED FASTER AND MORE EFFICIENTLY THAN ANY OTHER SYSTEM ON THE MARKET.



ENGINEERED LIKE NO OTHER

All USBL systems calculate position by measuring the range and bearing from a vessel-mounted transceiver to an acoustic transponder fitted to a moving target or placed on the seabed. But not all USBL systems do it with the accuracy and precision offered by Ranger 2.

We've taken everything that made our original Ranger system so effective and advanced it to the next level. That next level is our award-winning 6G (sixth generation) acoustic hardware platform and Sonardyne Wideband® 2 digital signal architecture which work seamlessly together to deliver the best possible USBL positioning performance and operator experience.

Vessel and vehicle hardware is easy to install and configure. It can track your equipment to beyond 7,000 metres and update its position every second. It's engineered for shallow water, deep water, high elevation and multi-user operating scenarios. And if your vessel's fitted with a DP system – regardless of what make it is – Ranger 2 can interface with it.

THE ONLY USBL YOU'LL NEED

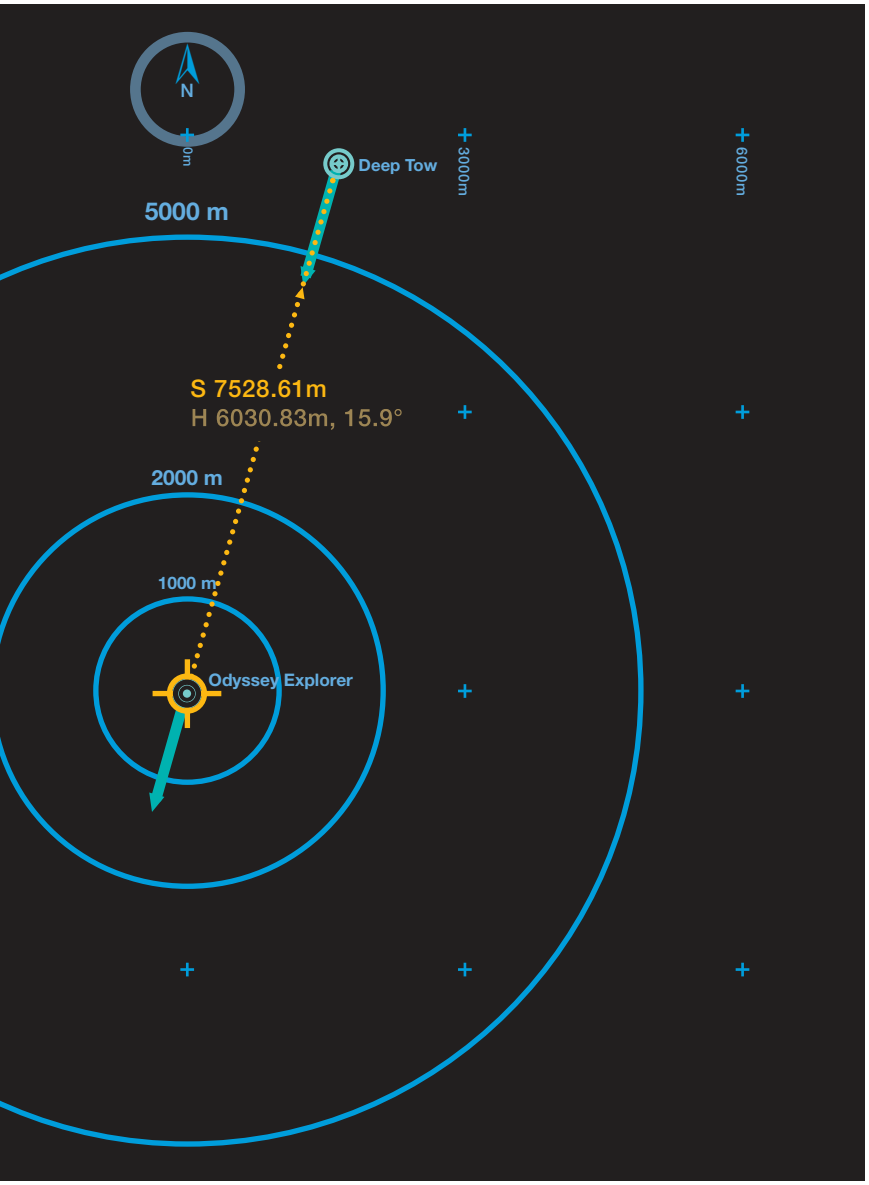
Every survey, ocean science, DP and seismic exploration project is different; different water depths, different vessels and different targets to position. But that shouldn't mean you need a different USBL system for each one.

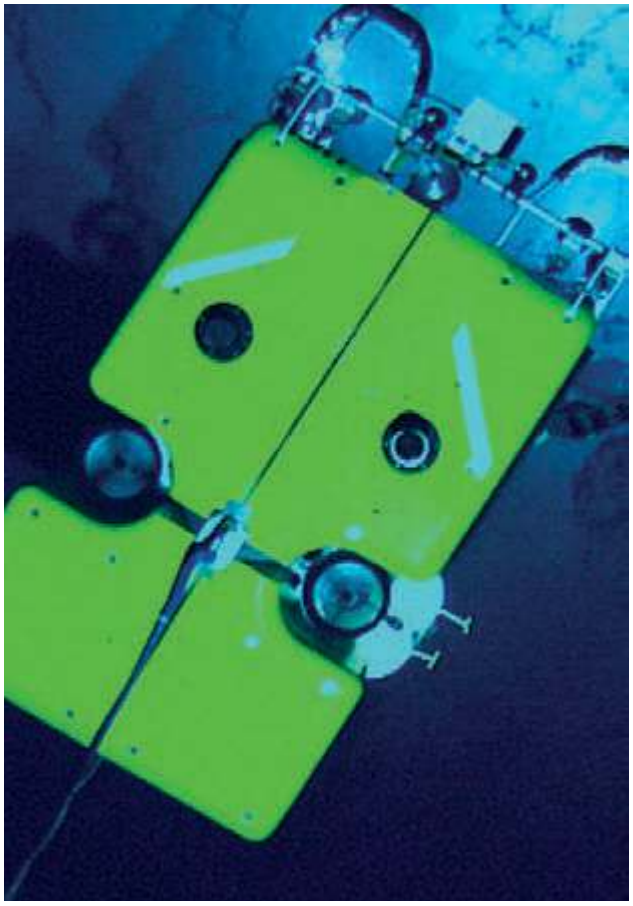
Ranger 2 comes with an impressive list of standard features. As your needs grow and become more complex, so too can the capabilities of Ranger 2 thanks to software feature packs available in three versions; Survey, Dynamic Positioning and Professional – all of which can be remotely activated* in the field.

*Subject to having the appropriate hardware available on board

WHY IT'S GOOD FOR YOUR OPERATIONS

- Simple, intuitive software
- Tracks an unlimited number of targets; ROVs, towfish, AUVs...
- Operating range beyond 7,000 metres
- Better than 0.1% system accuracy when optimised
- Up to 1 second position updates
- Compatible with all makes of DP system
- Automated setup reduces vessel delays
- Application packs available bringing extra features specific to your operations
- User training available worldwide
- Multi-user capable
- Track record of success on all types of vessel
- Support available globally 24/7


N
0m
Deep Tow
3000m
6000m
5000 m
S 7528.61m
H 6030.83m, 15.9°
2000 m
1000 m
Odyssey Explorer




VENTANA

RANGER 2 USBL FOR

SURVEY

WHETHER YOU ARE CONDUCTING A HYDROGRAPHIC SURVEY WITH A TOWFISH, MONITORING THE TOUCHDOWN POSITION OF A PIPELINE OR LOWERING AND LANDING STRUCTURES ONTO THE SEABED, RANGER 2 HAS ALL THE CAPABILITY YOU NEED IN ONE APPLICATION. THE OPTIONAL SURVEY PACK UNLOCKS A HOST OF ADDITIONAL FEATURES TO FURTHER OPTIMISE THE PERFORMANCE OF YOUR RANGER 2 SYSTEM FOR THE MAJORITY OF OFFSHORE CONSTRUCTION AND SURVEY TASKS.

RANGER 2 SURVEY PACK

The Ranger 2 Survey pack uses the intuitive and simple layout as the standard software but allows access to more complex areas such as the setup and tracking of ROVs, AUVs and structures. These objects can be configured with multiple transponders attached to them and fixed offsets can then be computed to points such as a structure's CRP or an ROV's bumper bar which can be both displayed on-screen with their position output.

Being able to work in this manner directly in the USBL software benefits your surveys as any sensor latency induced errors are minimised, and the risk of systematic errors from the use of incorrect offsets is reduced. AutoCAD backdrops and configurable seabed geodesy allow Ranger 2 Survey to be used for tracking and guidance. Complex doesn't have to be complicated.

WHY IT'S GOOD FOR SURVEY

- Up to 0.07% slat range tracking performance using GyroUSBL
- Supports complex tracking scenarios such as structures and vehicles with multiple transponders and multiple remote offsets
- Importable AutoCAD DXF field backdrops
- Built-in seabed geodesy package
- Configurable UI to suit multiple project tasks
- Tools to configure stinger-mounted GyroUSBL transceivers
- System can be shared with DP


BSEA
WLL 15T

RANGER 2 USBL FOR

DYNAMIC POSITIONING

OUT OF THE BOX, RANGER 2 IS A HIGHLY CAPABLE ACOUSTIC POSITION REFERENCE SYSTEM THAT YOU CAN INTERFACE WITH ANY DP SYSTEM INCLUDING GE, KONGSBERG, MT, NAVIS, ROLLS-ROYCE AND WÄRTSILÄ. BUT IF YOUR VESSEL UNDERTAKES CRITICAL STATION KEEPING ACTIVITIES IN ULTRA-DEEP WATERS, THE RANGER 2 DP PACK OFFERS ENHANCED LEVELS OF POSITIONING INTEGRITY. DEVELOPED TO MEET THE REQUIREMENTS OF CLASS 2 AND 3 RULES, IT'S PERFECT FOR HEAVY CONSTRUCTION, WELL INTERVENTION, SALVAGE AND PRODUCTION VESSELS.

RANGER 2 DP PACK

The DP pack's stand-out feature is its ability to support Long and Ultra-Short BaseLine (LUSBL) and inertial navigation (DP-INS) configurations.

LUSBL exploits the greater precision and acoustic range redundancy offered by Long BaseLine (LBL) seabed transponder arrays where accuracy is virtually independent of water depth. And because Ranger 2 is built around our exclusive Wideband 2 signal architecture, you have the freedom to deploy your own transponder array without interrupting others, or share one that is already deployed in the field, saving vessel time and lowering your costs.

Tightly integrated acoustic and inertial positioning benefits your DP system by improving the accuracy, update rate and reliability of the position. The inertial navigation system can be aided by a single USBL transponder or multiple transponders – but far fewer than a conventional LBL array. Transponders can also be set to a slower update rate, extending their battery life saving deployment and calibration time and extending service intervals.

DPO FRIENDLY

DPOs quickly feel comfortable using Ranger 2's easy and intuitive software. Automatic discovery of Sonardyne transponders and array planning tools are included as standard whilst real-time quality indicators, noise analysis and signal travel time displays are just some of the extra tools available to help them optimise performance.

WHY IT'S GOOD FOR DP

- High integrity positioning for critical deep water operations
- Fully compatible with all makes of DP system
- Cost effective for owners and shipyards
- Less wiring, fewer components and smaller gate-valve than comparable systems
- Easy to learn, easy to use
- DP-INS for added reliability and operational savings
- Dual transceivers for added accuracy


CCC PIONEER


CCC

RANGER 2 USBL FOR

EXPLORATION

WITH ITS ABILITY TO SIMULTANEOUSLY TRACK MULTIPLE SUBSEA TARGETS, RANGER 2 IS IDEAL FOR MARINE SEISMIC OPERATIONS WHERE VERY LARGE AREAS OF THE SEABED ARE COVERED WITH NODES AND THEIR PRECISE LOCATIONS CONFIRMED BEFORE ACQUISITION CAN BEGIN. BUT RANGER 2 DOES MORE THAN SIMPLY POSITIONING. THE HIGH-SPEED ACOUSTIC COMMUNICATIONS BUILT INTO EACH NODE-MOUNTED 6G TRANSPONDER MEANS THAT DURING A SURVEY, DATA CAN BE UPLOADED TO THE SURFACE TO LET YOU KNOW EACH NODE'S STATUS.

FROM SHALLOW TO DEEP

Seismic surveys using Ocean Bottom Nodes (OBNs) are a popular method of acquiring high resolution reservoir imagery. Ranger 2 USBL is used to determine the locations of thousands of marine seismic nodes – or the ROVs that deploy them – when operating in the transition zone all the way to very deep water.

When ROVs are used, Ranger 2 integrates seamlessly with our SPRINT INS and Syrinx DVL products to maximise ROV positioning performance. This minimises the number of observations required to achieve your project's specification.

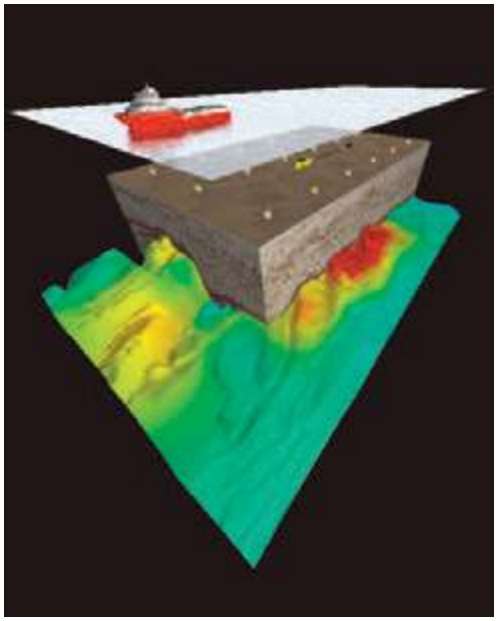
THIRD PARTY SOFTWARE INTERFACES

Node deployment operations are typically conducted under the control of third party navigation packages such as HydroPos and Gator II so Ranger 2 comes with a remote control interface provided as standard.

Once your survey is complete, the precision offered by Ranger 2 allows an ROV pilot to navigate directly to each node to recover it. This saves time and ensures no hardware is left behind on the seabed. Alternatively, the transponders attached to each node can be acoustically commanded to release anchor weights so that the entire instrument floats up to the surface.

WHY IT'S GOOD FOR EXPLORATION

- Thousands of unique transponder addresses permit large node arrays without identity repetition.
- Compatible with Sonardyne ROV based INS and DVL products for seamless operation.
- High update rate maximises deployment speed.
- Quick to install on vessels of opportunity using pre-calibrated transceivers
- Remote control interface to standard seismic navigation systems such as HydroPos and Gator II.

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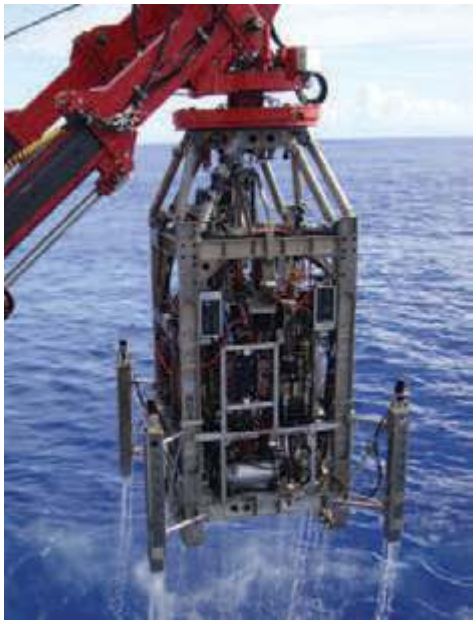
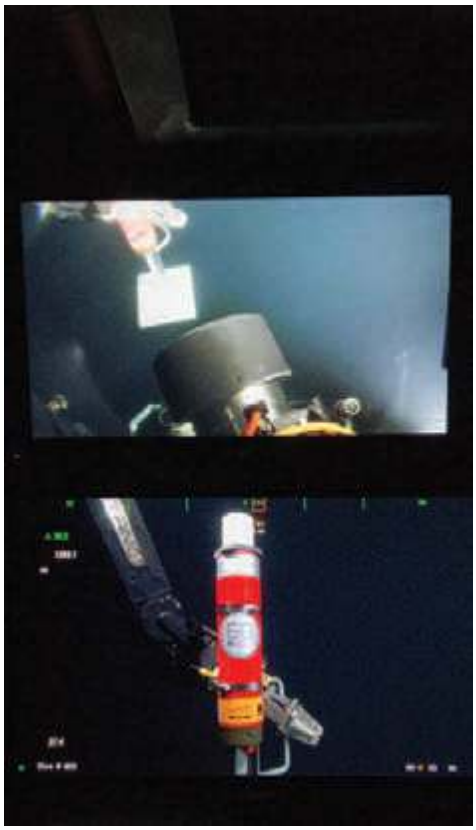
RANGER 2 USBL FOR

OCEAN SCIENCE

CHOSEN FOR ITS ABILITY TO TRACK A WIDE VARIETY OF SCIENTIFIC PACKAGES AT RANGES UP TO 10,000 METRES, RANGER 2 IS THE PREFERRED USBL SOLUTION FOR MANY OF THE WORLD'S LEADING OCEAN RESEARCH INSTITUTES. IT IS A KEY ENABLER FOR THEIR VESSELS AND HAS THE FLEXIBILITY TO MEET THE PRECISE IN-WATER AND NEAR-BOTTOM SUSTAINED OBSERVATION NEEDS OF SCIENCE USERS WORKING NEARSHORE, COASTAL AND DEEP OCEAN.





MAXIMISING SCIENCE TIME, MINIMISING DOWNTIME

Science users rarely have the luxury of remaining on site for long, so Ranger 2's ability to position instruments such as corers, camera platforms and geological drills without having to first deploy a seabed array of transponders, helps you maximise precious ship time. It can even be used to activate compatible acoustic release transponders, allowing you to release and track your moorings all the way to the surface for immediate recovery on board.

If your research involves using a vessel of opportunity, then the benefits of using Ranger 2 begin before you've left port. Our pre-calibrated, all-in-one GyroUSBL transceiver is perfect for installation on a temporary over-the-side mounting arrangement yet delivers the same precision as a permanent installation.

ULTRA-DEEP TOW

Ranger 2's unique Inverted USBL (iUSBL) mode, a feature of the Survey pack, is perfect for deep tow, extreme layback towfish tracking. Rather than mounting the USBL transceiver on the vessel in the traditional manner, with iUSBL, the transceiver is installed on the towed body itself. Because towfish are typically quiet, the signal-to-noise ratio is significantly improved which provides longer ranges and greater precision.

AUV OPERATIONS

When paired with Av-Trak 6, Ranger 2 enhances AUV operations, combining telemetry and positioning. The 6G Sonardyne Messaging Service supports the transfer of vehicle mission updates and USBL reference positions to the AUV, as well as status messages from it, and AUV-to-AUV telemetry.

SEABED GEODESY

Ranger 2's flexibility allows you to recover data from our Autonomous Monitoring Transponders, which are increasingly being used for the long term measurement (up to 10 years) of seabed tectonic deformation. With both MF and LMF options available to support this capability, Ranger 2 HPTs can also be supplied as stand-alone modems for over-the-side wire deployment on ships not fitted with a Ranger 2 system.

WHY IT'S GOOD FOR OCEAN SCIENCE

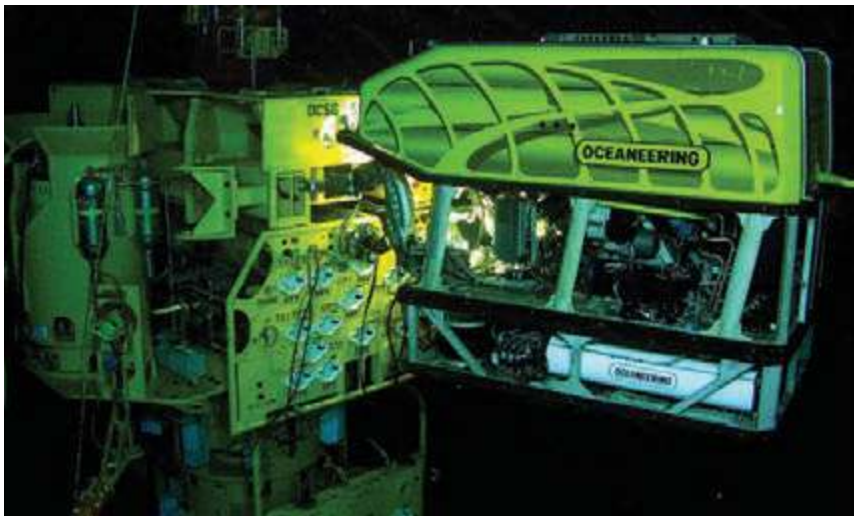
- Tracks AUVs, ROVs and other equipment to full ocean depth
- Maintains performance in noisy, shallow water environments
- Built-in fast data telemetry capability
- Supports MF and long range LMF operating bands
- Easy to install on vessels of opportunity
- Inverted USBL mode for tracking over long laybacks
- Software is simple and intuitive
- Compatible with all DP systems

Image: SOI

RANGER 2 USBL FOR

UNRIVALLED CAPABILITY

BE PREPARED FOR ANY VESSEL AND SUBSEA POSITIONING SCENARIO BY CHOOSING THE HIGHEST SPECIFICATION RANGER 2 PACK AVAILABLE – PROFESSIONAL. WITH THIS FEATURE PACK INSTALLED, YOU AND YOUR VESSEL HAVE GOT THE UNRIVALLED ABILITY TO SELECT WHICHEVER FEATURE YOU WANT, WHEN YOU WANT IT



RANGER 2 PROFESSIONAL PACK

Whether it's to provide an acoustically aided reference telegram to a DP desk whilst simultaneously tracking a complex structure with multiple transponders attached, or tracking an ROV overlaid on a geodetic backdrop whilst outputting an LUSBL DP telegram, Ranger 2 USBL Professional can do all this and more.

SURVEY AND DP

Ranger 2 Professional directly benefits multi-purpose vessels by enabling you to take advantage of the powerful position reference features found within the DP pack along with all the tracking features found within the Survey pack. This enables vessels to operate using a single USBL system for both DP and construction survey tasks which makes ownership and operation much simpler.

Professional retains the same easy to use UI of the standard version enabling you to make the switch with the minimum of extra training required. And, like the Survey pack, the UI can display exactly what you want to see.

WHY I'TS GOOD FOR ANY OPERATION

- Up to 0.07% slant range tracking performance
- Full support for aided INS and LUSBL vessel DP references
- Capability to track structures and vehicles with multiple transponders and multiple remote offsets
- Can operate in Standard and Optimised tracking modes
- Easy to install on vessels of opportunity
- Support for all Sonardyne 6G USBL transceivers, transponders and responders
- Configurable UI to suit multiple project tasks

BRIDGE & INSTRUMENT ROOM

EASIER, FASTER AND NOW MORE CONFIGURABLE. THE LATEST VERSION OF RANGER 2 OPERATING SOFTWARE IS UNLIKE ANY OTHER ACOUSTIC POSITIONING SOFTWARE PACKAGE AND BRINGS TOGETHER ALL THE FEATURES SURVEYORS, SCIENTISTS AND DPOS TOLD US THEY WANTED TO SEE. IF YOU'VE NEVER USED A USBL SYSTEM, YOU'LL QUICKLY FEEL COMFORTABLE USING RANGER 2 AND IN NO TIME, BE READY TO CONFIGURE YOUR FIRST UNDERWATER TRACKING OPERATION. IT'S ALSO DESIGNED SPECIFICALLY TO TAKE ADVANTAGE OF THE POWERFUL FEATURES CONTAINED WITHIN EVERY 6G TRANSPONDER AND TRANSCEIVER.

ALL THE TOOLS YOU NEED

Ranger 2 benefits from a completely revised main UI, a centralised transponder management table, an array planning tool for DP operations, configurable displays, and integrated support for iWand, our go-anywhere back deck test and configuration device for 6G transponders. And when you need them, remote infield upgrades unlock extra features – ensuring you only pay for what you need.

- **Highly configurable navigation chart with layers**
- **Importable DXF backdrops**
- **Remote control and output telegrams**
- **Built-in performance verification and optimisation tools**
- **Automatic detection of previously deployed transponders including configured address**

NAVIGATION PC (NAVPC)

The NavPC and NSH are designed to meet the complete on-board requirements of any Ranger 2 positioning operation. Featuring an Intel® Core i7 processor, the NavPC is purpose built to run the family of Ranger 2 software applications and is proven to withstand the rugged environmental conditions associated with marine operations. It measures just 2U high so is ideally suited for mounting in an instrument rack, portable case for temporary installations or within a DP desk.

- **Designed to industrial PC standards**
- **Internal security dongle**
- **Shock-mounted hard drive**
- **Dual screen (VGA, DVI or HDMI)**
- **Ethernet or Serial interface to NSH**

NAVIGATION SENSOR HUB (NSH)

The NSH is the interface between the in-water acoustic instruments, sensors and the NavPC which runs the Ranger 2 positioning software. In addition to accurately time-stamping incoming data from external devices such as gyros, VRUs and GNSS, the NSH also provides power and communications for ship-borne acoustic transceivers.

- **Configurable for stand-alone or dual independent modes**
- **Up to 16 Ethernet or serial interfaces**
- **6 transceiver serial ports providing 24/48 V DC power**
- **Sub-microsecond time-stamping on all Tx/Rx data**

SHIP FIT EQUIPMENT

TRANSCEIVERS

WHEN IT COMES TO USBL TRANSCEIVERS, ONE MODEL DOES NOT FIT ALL SITUATIONS AND VESSELS. THAT'S WHY OUR HIGH PERFORMANCE TRANSCEIVER (HPT) IS AVAILABLE WITH DIFFERENT ARRAY DESIGNS RANGING FROM FULL HEMISPHERICAL COVERAGE TO DIRECTIONAL DESIGNS FOR ULTRA-DEEP WATER AND HIGH VESSEL NOISE OPERATING ENVIRONMENTS. HPT TRANSCEIVERS CAN ALSO BE USED AS WIRELESS MODEMS FOR AUTONOMOUS MONITORING TRANSPONDER SETUP AND DATA RETRIEVAL AS WELL AS SUPPORTING LBL OPERATIONS.

TOWFISH MOUNTED

iUSBL/GYROiUSBL

A subsea vehicle based transceiver that turns conventional USBL tracking on its head. Designed for projects using deep tow, long layback survey platforms requiring high precision.

HPT 13000

A specialist USBL transceiver available to support tracking projects in the deepest water. The large array and advanced multi-element signal processing enables transponders to be tracked with ultimate precision.

LMF HPT

A Low Medium Frequency (14-18kHz) transceiver to ensure maximum data telemetry rate and positioning range whilst providing simultaneous multi-user operation with systems in other bands of operation. Identical functionality to that of Medium Frequency band HPT instruments.

GYROUSBL 5000/7000

Lodestar subsea AHRS sensor and HPT transceiver in one unit. GyroUSBL can be pre-calibrated for rapid and cost-effective deployment on vessels of opportunity. Available with standard and deep water optimised arrays.

HPT 7000

A USBL and LUSBL transceiver optimised for noisy dynamically positioned drilling and construction vessels operating in deep water. Vessel and thruster noise is rejected.

HPT 5000

Enables subsea targets to be tracked with precision and repeatability over a wide range of water depths and elevations. Supports high speed 6G data telemetry mode.

SHIP FIT EQUIPMENT

OPTIONS

OPTIMISED USBL

The positioning accuracy obtainable from Ranger 2 can be further improved by co-locating Lodestar, our premium quality Attitude and Heading Reference system (AHRS), with your vessel's 6G acoustic transceiver.

Known as Optimised USBL, the advantage of this configuration is that raw USBL range and bearing data is simultaneously processed with the Lodestar's attitude data. This achieves a tightly compensated solution that enables a system accuracy of 0.1% of slant range to be achieved. Available with standard Ranger 2 systems, or those enabled with Survey, DP and Professional feature packs.

TIP If you don't need the extra performance offered by Optimised USBL, the bridge-installed version of Lodestar is a cost effective replacement for your ship's gyro and VRU.

DP-INS

For tightly integrated acoustically-aided inertial DP operations ,you will need to install our DP-INS sensor to work alongside your Ranger 2 system.

GyroUSBL transceivers have this sensor built-in, its capability simply needs to be enabled. Alternatively, we offer a stand-alone unit for installing on your bridge or deployment machine. Both units incorporate three Ring Laser Gyroscopes and three accelerometers selected for use for their performance, high mean time between failure (MTBF) and ease of export (non ITAR). These sensors have highly stable error characteristics and are compensated for temperature variation.

TIP Did you know we use RLGs and inertial sensors with a 400,000hrs MTBF, proven over 15 years of use in almost every commercial airliner?

VIEWPOINT REMOTE WORKSTATION

If you want to share and visualise positioning data from your Ranger 2 system with other teams on board, then you will need a Viewpoint remote display workstation.

It enables you to transform co-ordinates of surface vessels, subsea vehicles and structures into geographical information overlaid on easy-to-use guidance displays. When changes to Ranger 2 are made, such as adding a new tracked target, they automatically appear on ViewPoint workstations. And because it is serially interfaced with Ranger 2, Viewpoint is totally secure; there is no way to affect live survey and DP operations.

TRANSCEIVER DEPLOYMENT – PERMANENT

USBL system performance is seriously degraded by poor transceiver mounting and deployment so we've developed a family of highly engineered deployment machines suitable for any situation. Validated on hundreds of vessels, our through-hull hydraulic deployment machine is ideal for permanent installations and features a stiff, corrosion-resistant pole, high integrity bearing and sealing design and reliable hydraulic actuation with safety interlocks, sea chest for access, and remote control options.

Where through-hull deployment via a gate valve is not available or practical, a through-tube machine is available. Modular, easy to transport sections accommodate any pole length and once deployed, the pole is held rigidly in place using a self-contained hydraulic clamping mechanisms.

TRANSCEIVER DEPLOYMENT – TEMPORARY

For short term projects using a vessel of opportunity, our modular over-the-side deployment pole provides a cost-effective and practical solution. Pole lengths can be adjusted by adding or removing sections and once the assembled pole is lowered and locked into position, a high degree of stability is assured.

- **High performance, high integrity survey grade deployment system**
- **Drag and vortex reducing strakes**
- **Deck and hull mount options**
- **Sectional pole allows length to be configured for each vessel**
- **Good corrosion resistance**
- **Custom design available for other manufacturers instrumentation**
- **Easy to transport and assemble**

VEHICLE FIT/SEABED EQUIPMENT

TRANSPONDERS

WIDEBAND SUB-MINI 6+ (WSM 6+)

Included with any purchase of our Ranger 2 USBL system, WSM 6+ is the ideal choice of transponder for tracking mobile underwater targets such as a towfish, crane wire, ROV and manned submersible. 2-way wideband signals ensure reliable acoustic performance in all conditions.

- **Small and rugged**
- **1,000 metre and 4,000 metre depth ratings**
- **Omni-directional or directional transducers**
- **Inbuilt depth sensor aids USBL performance**
- **Responder mode for fast position updates**
- **Rechargeable battery**

TIP iWand – use it to test and configure any 6G transponder on the back deck. You can even import their settings straight into Ranger 2.

WIDEBAND MINI TRANSPONDER 6 (WMT 6)

If size and weight are important considerations, but you need the capability to track equipment in water depths up to 7,000 metres, look no further than the WMT 6. Its high power acoustic output means it's perfect for noisy operating environments.

- **3,000 metre, 5,000 metre and 7,000 metre depth ratings**
- **Available with remote transducer (3,000 metre version)**
- **Mini size – small and lightweight**
- **Full 2-way Sonardyne Wideband communications**
- **Responder mode for fast position updates**
- **Long life Li-ion battery**

TIP If you're not using your WMT for a while, the unit's external On/Off switch helps to ensure it is always ready for your next operation.

AV-TRAK 6

Av-Trak 6 combines the functions of a USBL transponder, LBL transceiver and wireless communications link in one low power instrument that's perfect for missions involving AUVs. Available with electronics-only for customer integration and a custom I/O for mission abort and ballast jettison.

- **Combined transponder, transceiver and telemetry instrument**
- **Track it, navigate it and command it**
- **Depth ratings to 7,000 metres**
- **Can aid vehicle's INS system**
- **Remote transducer option for easy vehicle installation**
- **Rechargeable battery**

TIP If space on your vehicle is limited, Av-Trak 6 can be supplied with a remote transducer allowing you to install the main electronics housing wherever you want.

WIDEBAND RELEASE TRANSPONDER 6 (WRT 6)

WRT 6 is a dedicated acoustic release transponder which you can use with Ranger 2 to deploy, track and detach seafloor equipment and instrument moorings. It uses field-proven mechanics combined with 6G electronics to ensure interference-free operation in multi-user scenarios.

- **1,275 kg Working Load Limit (WLL)**
- **Higher WLL available with load maximisation frames**
- **Highly reliable release mechanism**
- **External On/Off switch to maximise battery life when not in use**
- **Depth rated to 3,000 metres**
- **Can be positioned using Kongsberg HiPAP® systems**

TIP Load amplification frames extend the WLL of WRT 6s – perfect for structure installation projects.

DYNAMIC POSITIONING TRANSPONDER 6 (DPT 6)

If you need an ultra-dependable, cost effective seabed DP reference transponder, DPT 6 is the answer. It's quick to set up on the back deck, easy to deploy and can be recovered without the need to send down an ROV.

- **Highly reliable acoustic release mechanism**
- **3,000 metre, 5,000 metre and 7,000 metre depth ratings**
- **Robust acoustic performance in all conditions**
- **Hundreds of operating channels**
- **Choice of sensors including depth, temperature and inclinometer**

TIP If you're deploying a Compatt or DPT on the seabed, you'll need a floatation collar. We have designs to suit every application.

COMPATT 6 (C6)

From Mini to Mega, C6 is the industry standard transponder used for high precision subsea survey and construction in all water depths. Available in a wide range of sizes, materials, sensor and battery configurations, ask us which one is right for your project.

- **Multi-functional transponder; supports USBL, LBL, modem and gyro applications**
- **Mini, Midi, Standard, Mega and Maxi sizes**
- **Can be used by multiple users simultaneously**
- **Extensive choice of sensors, depths and batteries**
- **Global track record of success**

SUPPORT

WE INSTALL, WE TRAIN, WE MAINTAIN.

WITH SEVERAL THOUSAND USBL INSTALLATIONS SUCCESSFULLY UNDERTAKEN, WE HAVE THE EXPERIENCE TO WORK SIDE-BY-SIDE WITH YOUR NAVAL ARCHITECT, SHIPYARD, DP SUPPLIER AND CREW TO MAKE THE PROCESS OF INVESTING IN RANGER 2 PROBLEM-FREE AND LOW-RISK. IT'S ALL PART OF THE SERVICE THAT HELPS LOWER YOUR OPERATIONAL RISK, SPEED UP YOUR SUBSEA OPERATIONS AND KEEP VESSEL DOWNTIME TO A MINIMUM.

EXPERT ADVICE

Our long-term partnership with clients has enabled us to develop a unique and extensive insight into the diverse nature of underwater operations and the associated commercial and operational pressures. We understand that the technology investment decisions you take today, will affect your operational capability for years to come so they need to be right.

That's why you can trust our global commercial and technical teams to give you expert advice on which Ranger 2 system is best for you, how to finance it (now including lease rental), where and how it should be installed, what transponders you need and the typical performance you can expect to see based on how and where you'll be using it.

OPERATOR TRAINING

Making sure that you get the very best out of your Ranger 2 system once it is installed and commissioned is the goal of our operator training programme. From standard courses run at our worldwide centres to bespoke courses held on your vessel, Sonardyne's training is comprehensive and flexible.

HELP WHEN YOU NEED IT

Once you become a Sonardyne Ranger 2 customer, you gain unrivalled access to our customer care programme. A dedicated email helpline connects you to product engineers ready to answer your questions but if it's more urgent, our 24 hour worldwide telephone help-line is standing by ready to resolve any operational issues you're facing.

ANNUAL SERVICE VISITS

Of course, the best way to ensure your equipment always performs as it should, is to service it regularly. Book an annual service visit, and one of our field engineers will inspect the health of your vessel's system including updating software and firmware and inspecting your deployment machine to make sure regular checks are being carried out. Transponder sensors can be re-calibrated at any one of our international service centres.


HPT 5000
FORWARD


This is to certify that
Your DP Officer
Has attended
The 2 day Ranger 2 USBL
Operators Training Course
At Sonardyne Sea Trials Centre
Plymouth, UK
Course Instructor:
Certificate Number: 1064

Sonardyne
SOUND IN DEPTH

SUBSEA TECHNOLOGY

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Sonardyne
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SUBSEA TECHNOLOGY

Micro-Ranger 2 is an acoustic positioning system for tracking divers, remotely operated and autonomous underwater vehicles. Portable and quick to mobilise, Micro-Ranger 2 can be deployed from any waterside location or vessel of opportunity, including RHIBs and small survey vessels. This makes it ideal for supporting marine operations conducted in rivers, lakes and coastal waters. The system has an operating range of 995 metres and can update you with the position of each target being tracked up to twice a second.

SONARDYNE MICRO-RANGER 2 USBL
UNDERWATER TARGET TRACKING SYSTEM

SYSTEM OVERVIEW

Micro-Ranger 2 works using a positioning technique known as Ultra-Short BaseLine (USBL) to calculate the position of underwater targets. A transceiver at the surface transmits an acoustic signal to transponders attached to each of the targets you wish to track. Using the return signal from each transponder, Micro-Ranger 2 determines its range (distance), bearing (heading) and depth, displaying the results on a radar-style software display.

If you're a first time user of USBL technology, you'll find Micro-Ranger 2 incredibly easy to use. Simply connect your computer, external GPS and transceiver to the system's interface unit, then attach a transponder to each target you want to monitor the position of. With the transceiver lowered into the water, you're ready to start tracking up to 10 divers, underwater vehicles or equipment. To deliver the best possible positioning performance and operator experience, Micro-Ranger 2 is built around the same market-leading 6G hardware and Wideband 2 digital acoustic technology you'll find in our family of deep water USBL systems, Mini-Ranger 2 and Ranger 2, but for significantly less cost and complexity.

TOPSIDE EQUIPMENT > Micro-Ranger Transceiver

The Micro-Ranger Transceiver (MRT) is the key innovation at the core of the Micro-Ranger 2 system. Extremely small and light, the MRT can be deployed from the side of any vessel, pontoon, or even USV (Unmanned Surface Vessel). The configuration of the receiver elements inside provide omni-directional acoustic tracking coverage, so is ideal for tracking targets in shallow water all the way to the surface. It's design offers unrivalled range resolution and precision for a USBL system of this size.

WHAT YOU NEED TO KNOW

- Low-cost, easy-to-use underwater target tracking system
- Always know where your divers, seabed instruments and remotely operated vehicles are
- Use it in rivers, lakes, reservoirs and coastal waters
- Portable and quick to mobilise from any size boat or waterside location
- 995 metre operating range
- Fast position updates; up to twice per second
- No need for an export license; easy to ship internationally
- 6G inside; built around our digital wideband acoustic architecture

To optimise performance in different operating environments, the MRT has a built-in diagnostics mode to both listen to, and visualise signals and noise in the water.

Ethernet Serial Hub

The 1U-high Ethernet Serial Hub (ESH) provides a single, but all encompassing interface between peripheral sensors (e.g. external GPS receiver), acoustic instruments, mains power and the software running on your PC. Communications are all Ethernet based, enabling you to connect to a vessel's onboard network if one's available. The ESH also supports responder trigger and 1PPS (Pulse Per Second) time synchronisation across other surveys systems. It can be mounted in a 19" instrument rack or in a soft case for complete portability.

Software

Micro-Ranger 2 software comes with a lot of advanced and powerful features selected from our Mini-Ranger 2 and Ranger 2 USBL systems to ensure you have everything you need to track underwater targets. Designed for PCs running Windows 7 and Windows 10 operating systems, it's intuitive layout means you'll quickly feel comfortable using Micro-Ranger 2 and in no time be ready to carry out your first underwater tracking mission.

If you need to track and also communicate with small AUVs and drones, an optional Marine Robotics feature pack is available. Used in conjunction with a Sonardyne Nano AvTrak 6 transceiver (see website for more details) on your vehicle, the pack unlocks a host of features such as Data Exchange – used to enable modem functionality utilising Wideband 2 digital signal processing supporting user data transfer rates from 100 to 9000bps.

UNDERWATER EQUIPMENT > Nano and WSM 6+ Transponders

At only just over 150 mm long and weighing 225 grams, Nano is a popular choice for divers, man-portable AUVs and micro ROVs. Its wireless charging and Near Field Communications (NFC) capability means that storing it, turning it on and setting it up is also quick and simple. Two models are available; one with a pressure sensor for depth aiding and one without. Both are depth rated to 500 metres.

For tracking larger underwater targets such as a towfish, a crane wire or medium-sized ROV for example, WSM 6+ will meet your requirements. Depth rated to 1,000 metres and featuring a rechargeable battery pack, WSM 6+ can also be powered directly from your underwater vehicle so it can remain deployed for as long as you need it to.

Go-anywhere portability Micro-Ranger 2 gives you the flexibility to operate virtually anywhere. Connect up your laptop, MRT transceiver, external GPS and power to the ESH and you're ready to start tracking.

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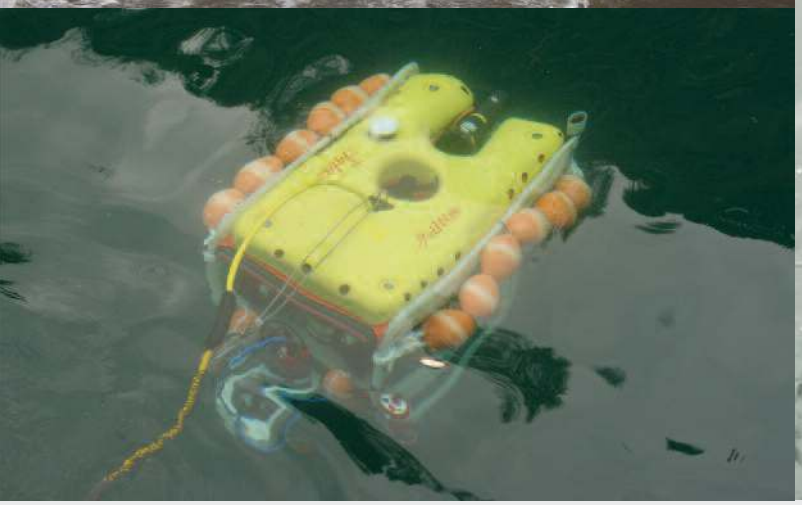
Deploy it, track it
Micro-Ranger 2 is a sixth-generation (6G) Ultra-Short BaseLine (USBL) underwater positioning system. It is highly portable and offers the functionality and performance you come to expect from Sonardyne acoustics. Use it to track a small ROV, a diver or any other small target in ranges of up to 995 metres at very fast update rates.

Transponder options
Whether you're tracking a small underwater instrument, search and rescue diver or micro ROV, Nano (below left) and WSM 6+ transponders perfectly compliment your Micro-Ranger 2 topside hardware.



Sonardyne
SOUND IN DEPTH

SUBSEA TECHNOLOGY

SONARDYNE MINI-RANGER 2 USBL UNDERWATER TARGET TRACKING SYSTEM

Mini-Ranger 2 is part of our family of sixth-generation (6G) Ultra-Short BaseLine (USBL) underwater target tracking systems. It offers a standard operating range of 995 metres (extendable up to 4,000 metres) and the ability to simultaneously track up to 10 subsea targets (e.g. divers, ROVs and structures) at very fast update rates. These features mean that Mini-Ranger 2 is ideal for nearshore operations on small, quiet vessels, vessels of opportunity, pipelay vessels and construction barges that need survey grade positioning performance without the cost and complexity of a deep water USBL solution.

SYSTEM OVERVIEW

Mini-Ranger 2 calculates the position of your underwater targets by measuring the range (distance) and bearing (heading) from a vessel-mounted transceiver to an acoustic transponder fitted to each target; a technique known as Ultra-Short BaseLine (USBL) positioning. One of the main advantages of USBL is that no other in-water acoustic equipment has to be deployed before underwater operations can start. Only the targets being tracked need to be equipped with a transponder.

The Wideband 2 digital signal technology and Sonardyne 6G hardware inside Mini-Ranger 2 provides precise acoustic ranging that is easy to set up and operate, even in the most challenging subsea operating environments. These features improve the efficiency of subsea survey operations, reduce vessel delays and generate cost savings for owners.

Mini-Ranger 2 is compact and highly portable, comprising a rack, desk or console mountable Ethernet Serial Hub (ESH), HPT 3000 acoustic transceiver and software, which is installed on your PC or ruggedised laptop. A wide range of Sonardyne 6G mini transponders can be used with Mini-Ranger 2, allowing you to select the most appropriate beacon for each task. These include: Wideband Sub-Mini 6+ (WSM 6+), Release Transponder 6 family (RT 6), Wideband Mini Transponder 6 (WMT 6) and the ultra-small Nano.

WHAT YOU NEED TO KNOW

- Portable and quick to install on all types of vessel
- 0.2% system accuracy when optimised
- 995 metres standard tracking range; exempt from export control for fast, uncomplicated international shipping
- Tracking range extendable up to 4,000 metres depending on operating set-up
- Fast target position updates; up to 3 per second
- Automatic discovery and tracking of Sonardyne 6G transponders
- Audio Codec for live listening and recording acoustics
- Audio and visual diagnostic tools enable optimised performance
- Importable DXF chart backdrops

HPT 3000

At the heart of Mini-Ranger 2 is the HPT (High Performance Transceiver) 3000 transceiver. Small and lightweight, HPT 3000 is perfect for installation using temporary, over-the-side deployment arrangements.

The transceiver features a unique design of receiver array and transmitter, optimised to provide excellent tracking performance in shallow water, at high elevations, as well as in deeper water. USBL precision is dependent on the baseline between the receiver elements and signal to noise. This is where the HPT 3000 excels; its larger diameter array provides excellent precision and noise rejection.

A key feature of the HPT 3000 is Ethernet-based communications. This means connection to the topside computer (via the Ethernet Serial Hub, or ESH) is simple as it can be connected through a vessel's network via a single network socket – eliminating USB-to-serial drivers and their associated compatibility problems. Ethernet communications also enables in-water diagnostics, allowing you to both listen to, and visualise, signals and noise in the water.

ETHERNET SERIAL HUB

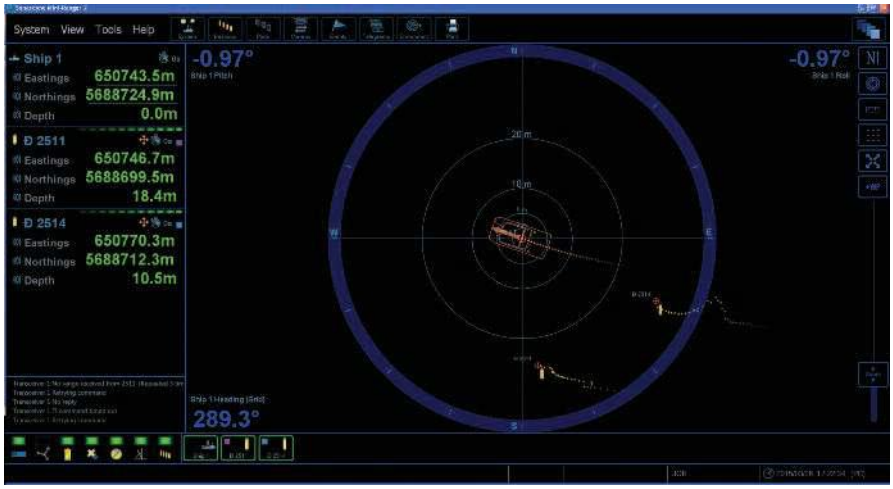
The ESH provides the interface between peripheral sensors, acoustic instruments, mains power and the software running on the PC. The ESH also supports responder trigger and one pulse per second synchronisation across systems.

SOFTWARE

Mini-Ranger 2 uses the same modern and intuitive software as our deep water USBL system, Ranger 2. An extensive set of tools are included to allow you to optimise system performance, including real-time audio and visual signal and noise analysis displays. Our CASIUS calibration tool is also included to correctly calibrate gyro and VRU offsets further improving positioning accuracy. A built-in calibration routine of the internal magnetic sensor minimises the time between installation and tracking.

If you need to track and also communicate with AUVs and drones, an optional Marine Robotics pack is available. Used in conjunction with our Nano AvTrak 6 transceiver on your vehicle, the pack unlocks a host of features such as Data Exchange – used to enable modem functionality utilising Wideband 2 digital signal processing, which supports user data transfer rates from 200 to 9,000 bps.

Software Mini-Ranger 2 shares the same modern and intuitive interface as our established Ranger 2 USBL system ensuring users quickly become confident in its use.



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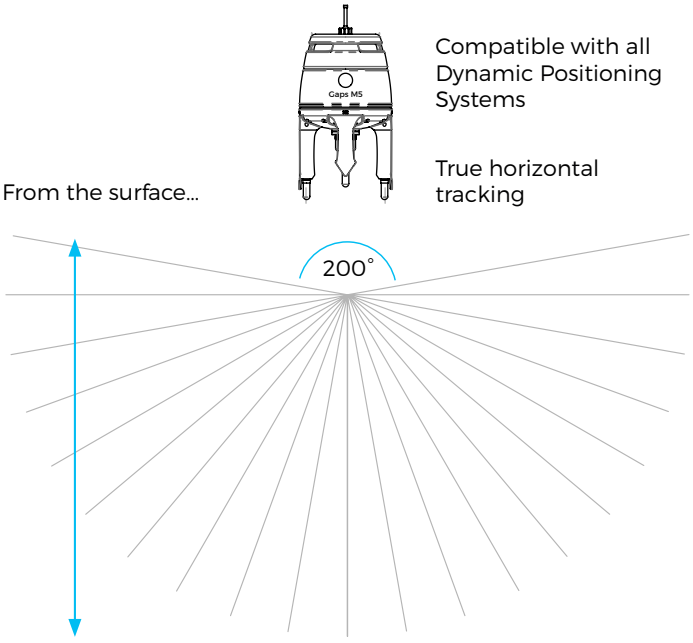
Ethernet Serial Hub and HPT 3000
The Ethernet Serial Hub (ESH) is a 1U-high (desk, console or 19in rack-mounted) unit for interfacing the HPT 3000 transceiver, GPS and user's PC running the Mini-Ranger 2 software. The HPT 3000 is designed for portable installation on small boats. It offers excellent performance in shallow water, at high elevations, as well as in deeper water.

Transponder options
Mini-Ranger 2 is compatible with a wide range of transponders including: Nano (below left top), WSM 6+ (below left bottom), RT 6-3000 (below right), as well as aircraft pinger locators.

Gaps M5

Calibration-free and export-free USBL system

Gaps M5 is a Medium frequency Ultra-Short Baseline (USBL) positioning system for accurate location, positioning and tracking of subsea assets, from ultra-shallow water to medium water depths.
It combines an USBL integrated with a heading and attitude sensor based on iXblue FOG technology. Free of export restrictions, Gaps M5 is a lighter and more compact version of Gaps, the lightest high-performance USBL system on the market.



FEATURES

- 200° aperture: above horizontal tracking.
- Not subject to export restrictions.
- Robust True North finding sensor.
- DP compatible LBL/USBL.
- Third-party transponder compatible.
- Acoustic communication (telemetry).
- 3D display software included (Delph Roadmap).

2019-12-DS-GapsM5

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iXblue

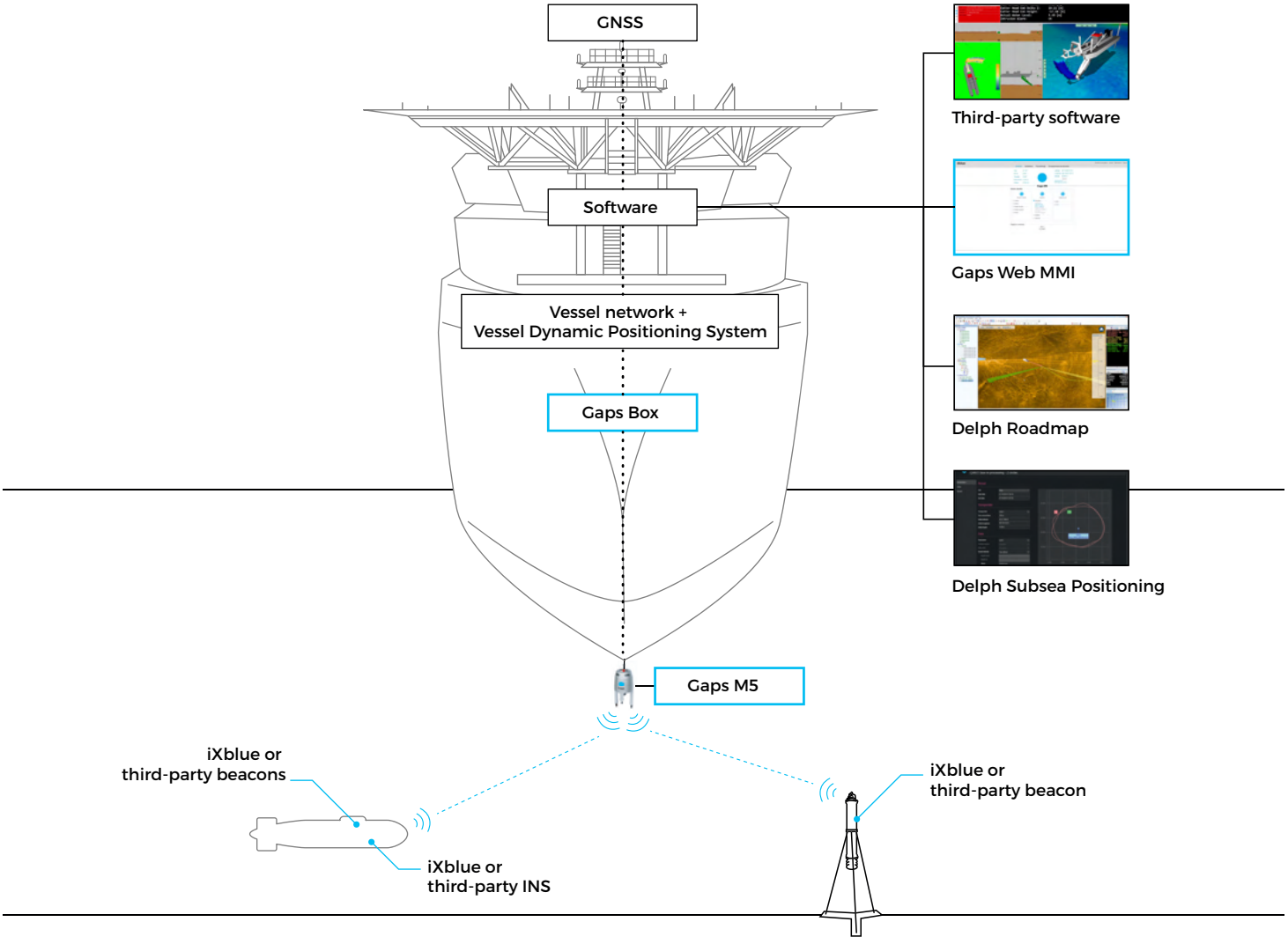
BENEFITS

- Calibration free.
- Shallow water and horizontal tracking.
- Highly accurate positioning (0.5% of the slant range).
- Easy to install, operate and repair for cost-efficiency.

APPLICATIONS

- AUV tracking
- ROV tracking
- Tow fish tracking
- Diver tracking
- Dynamic positioning
- LBL Box-in
- Offshore construction

GAPS ECOSYSTEM



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iXblue

COMPATIBLE TRANSPONDERS

MT912
Mini transponder

ZTA02C
OBC transponder

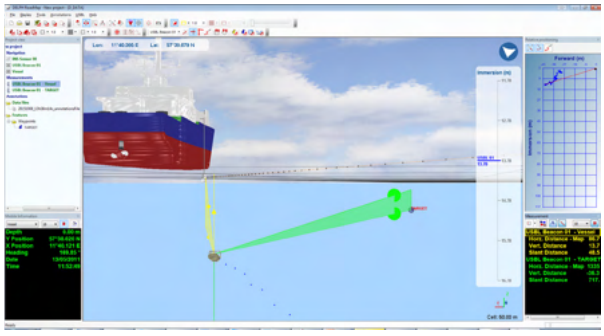
MTBx2 OEM
Positioning and
Communication transponder

Canopus
Intelligent LBL transponder

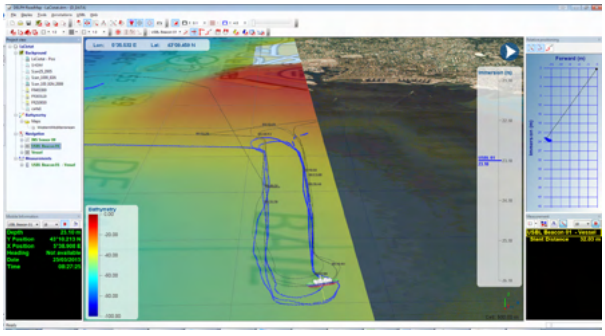
For third-party transponders compatibility: contact iXblue.
Compatible with all ixblue Oceano MF ranges and Canopus.

DELPH ROADMAP

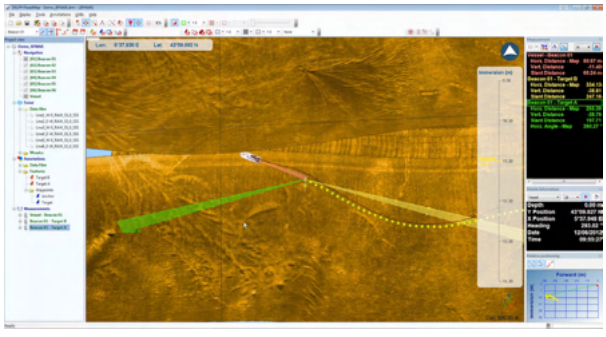
3D visualization software for real-time and offline
display. Compatible with iXblue INS, acoustic systems and NMEA
positioning devices..



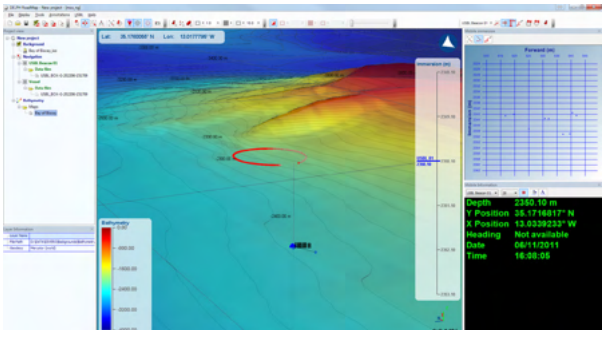
RT measurement between USBL and towed equipment



Tow-fish tracking



ROV tracking



USBL calibration

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iXblue

GAPS M5 TECHNICAL DESCRIPTION

Transceiver performance

Operating range*	995 m
Acoustic coverage	200°
Positioning accuracy**	Better than 0.5 % of the slant range
Range accuracy	20 mm
Operational frequency	MF (20-30 kHz)

Embedded MRU

Type	Fiber-optic Gyrocompass
Heading	0.5° secant latitude
Pitch & roll	0.1°
Settling time	5 minutes

Electrical

Power supply	230 VAC (50/60Hz) / 24-36 VDC
Consumption	22 W
Synchro IN	1 PPS ; 1 Trigger
Synchro OUT	2 TTL Pulses
Communication	4 Serial (RS232/422/485) 1 Ethernet (RJ45)

Environmental

Storage temperature	-40 to +70°C
Operating temperature	-5 to +35°C
Max. antenna deployment depth	25 m

Physical characteristics

Dimensions (Length x Diameter)	520.8 x 296 mm
Material	Carbon fiber painted
Weight in air /water	14 kg / -5 kg
Gaps cable length	20m (50m and 95m optional)

Interface unit (Gaps box)

Dimensions	233x330x94
Weight	4.6 kg
EMC	89/336/EEC - EN 60945

*: operating range depends on the conditions of measurement (NIS, SNR)
**: In vertical conditions. Including GPS error of 0.1m. Sound velocity profile compensated. Transponder transmit level = 191 ref µPa@1m. Slant range of 900m. SNR>10dB

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Gaps M7

High performance USBL positioning system

Gaps M7 is a high performance Ultra Short Baseline positioning and communication system for locating and communicating subsea assets. It combines an USBL antenna and a fiber-optic inertial navigation system (INS) in the same housing. USBL calibration on the field is not required anymore. Advanced acoustic techniques including wideband signals ensure maximum performance in most difficult conditions. Its unique 3D acoustic array enables tracking and communication from the deep sea to extremely shallow water, and even at angles above horizontal.

FEATURES

- Compact, all-in-one INS and USBL communication solution
- High grade INS for ultimate performance
- Provide absolute georeferenced position for the beacon
- Compatible with all major navigation suites
- Easy interface with subsea INS (iXblue and third party)
- DP mode : L/USBL/INS (PRS, MRU & Gyro in one equipment)
- More than 500 available acoustic channels
- Unified iXblue web interface
- 3D display software included (DELPH RoadMap)
- 3D acoustic array geometry
- Wideband modulation
- iUSBL (optional)

BENEFITS

- Rapid deployment
- Operational cost savings
- Pre-calibrated
- Easy to install
- Easy to operate
- Accurate positioning
- Robust performance
- Flexible deployment operations
- Horizontal tracking
- Wireless subsea communication with beacons

APPLICATIONS

Oil & Gas

Structure placement, ROV navigation, AUV & glider operations, towfish tracking, cable/pipe laying, diver tracking, exploration, drilling, mining, DP, seabed crawler, touch down positioning, mattress lay, plough/trench positioning, Out Of Straightness, BSR positioning, seismic (streamer, nodes, OBC), rig move, anchor positioning, riser positioning

Defence

Diver tracking, AUV tracking, underhull inspection, imagery, mine counter measure

Scientists

ROV, AUV, gliders and towfish tracking

2020-02-DS-Gaps

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GAPS M7 TECHNICAL SPECIFICATIONS

Positioning Accuracy [1]

	CEP50
[2] SNR = 0 dB	0.53% x Slant range
[2] SNR = 10 dB	0.17% x Slant range
[2] SNR = 20 dB	0.06% x Slant range

Range / Bearing Accuracy [3]

	RMS / STD DEV / 1 sigma (68%)
SNR = 0 dB	0.02 m / 0.30°
SNR = 10 dB	0.02 m / 0.09°
SNR = 20 dB	0.02 m / 0.03°

Performance [4]

Operating range	> 4,000 m
Coverage	200 deg below acoustic array
Operating frequency	21.5 kHz to 30.5 kHz MFSK (chirp)
Position refresh rate	1 to 15 s (depends on range) - 10 Hz with predictive filter
Nb of channels	> 500

Mechanical [5]

Housing	Carbon fiber painted
Weight in air / water	16 kg / -7 kg (positive buoyancy)
Overal dimension HxØ	638 mm x 296 mm - min gate valve required: 300 mm / 12’
Depth rate	25 m standard / 100 m non destructive

Environments [6]

Operating and Storage temperatures	-5 °C / +35 °C -40 °C / +70 °C
EMC	89 / 336 / EEC – EN 60945

Interfaces

Power supply range	100 to 240 VAC / 50~60Hz or 24/36 VDC - 30 W
Control / command	Ethernet with WEB-based user interface
Input / output ports	4 Ethernet and 4 serial (232 / 422 / 485)
Synchronisation IN	1 PPS and 1 external trigger
Synchronisation OUT	2 triggers
Display	Delph RoadMap 3D display software provided - Compatible with most of navigation software

(1) In vertical conditions. Including GPS error of 0.1 m. Sound velocity profile compensated. Transponder transmit level=191 dB ref µPa @ 1 m. Slant range of 1 000 m.
(2) SNR is input signal to noise ratio
(3) In vertical conditions. Responder mode.
(4) For a surface noise level below 67dB ref µPa/Transponder transmit level = 191dB ref µPa @ 1 m / vertical conditions.
(5) iUSBL optional
(6) NF X10-812

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Acoustic Communication

Data link for AUVs and ROVs	
Simultaneous positioning and communication	
Half-duplex (Gaps head to beacon / beacon to Gaps head)	
Data rate	500 bits/s (burst)
Doppler	+/- 6 knots

GAPS BOX TECHNICAL SPECIFICATIONS

Dimensions	233 mm x 330 mm x 94 mm
Weight	4.6 kg
Operating and Storage temperatures	-5°C to +50°C -40°C to +80°C

INERTIAL NAVIGATION SYSTEM SPECIFICATIONS

Performance [1]

Position accuracy with GPS	Three times better than GPS accuracy
No aiding for 2 min / 5 min	3 m / 20 m (CEP50)
Pure inertial mode	0.6 nm / hour (CEP50)
Heading accuracy	0.01 deg secant latitude RMS
Roll and pitch dynamic accuracy (no aiding)	0.01 deg RMS
Heave accuracy (Smart Heave) [2]	2.5 cm or 2.5 % RMS

(1) Secant latitude = 1 / cosine latitude
(2) Whichever is greater for periods up to 30 seconds. Smart heave is delayed by 100 s fixed value.
Real-time heave accuracy is 5 cm or 5% whichever is greater.

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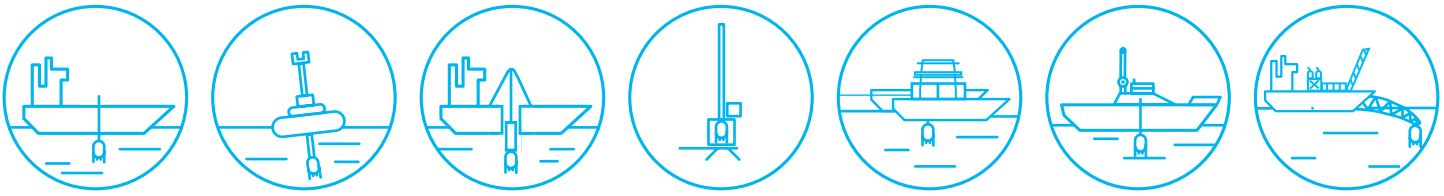
SYSTEM DEPLOYMENT

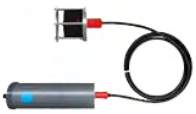


Side pole | Buoy | Moon pool | Hoisting system | Towed platform | Drone (USV) | Pipelay Vessel

Contact iXblue for pole drawings.
iXblue can provide the hoisting system.

COMPATIBLE BEACONS

iXblue MT8x2
Mini beacon
Lithium batteries



iXblue MT9x2
Mini beacon
Rechargeable batteries

iXblue ZTA02C
Beacon for seismic applications

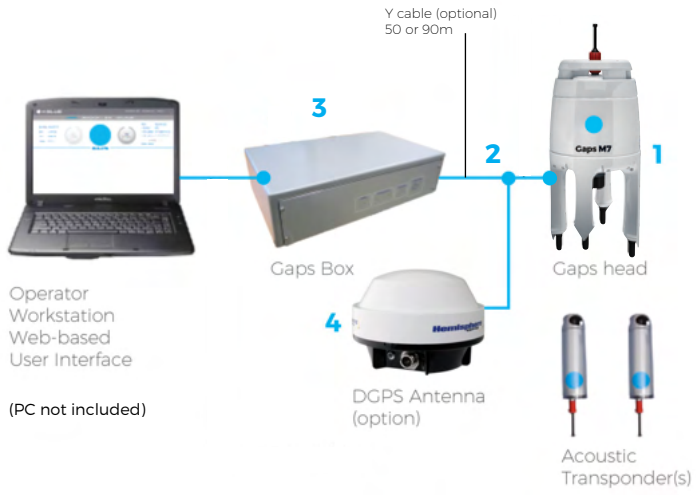
iXblue Ramses
LBL Sparse Array Acoustic System

iXblue Canopus
LBL and sparse-LBL intelligent transponder

Applied
1000 series
Contact iXblue
for performances

Other modulation :
contact iXblue

COMPONENTS



1 - This is the main part of the Gaps M7 system, which comprises the acoustic array to communicate with the transponder(s) installed on the target(s), the INS for motion compensation and absolute georeferencing, and all electronics and signal processing.

2 - 50 or 95 m long cable used to communicate with Gaps M7 head. Possible options: ATEX, 95m and greater length using repeater Box.

3 - Gaps M7 Box designed to interface between the Gaps M7 head and external peripherals. It includes power supply from mains & 28 Vdc, Ethernet connector, RS422 / 232 input/output and synchro in/out on BNC.

4 - A complete turnkey solution is available on option, including a GPS receiver.

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