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For our company, 2014 has begun where 2013 left off; record levels of investment and growth in every part of our business operations to meet the demand for our subsea solutions, many of which we feature here in this issue of Baseline.

2014 is an 'Oceanology' year, the biggest event in our bi-annual events calendar where we reveal our latest product developments to a global industry audience. uComm is one such development, a simple to use underwater modem that can transfer your data from A to B quickly and reliably and with barely any setup required. Read more on page 12. Sticking with the modem theme, on page 24 we bring you up to speed with the latest trials of our optical communications platform BlueComm.

This year we are also celebrating the 21st anniversary of our first USBL system being commissioned. The Product Focus on page 18 takes a close look at Ranger 2, our current generation platform and the many features that set it apart from its rivals.

Custom engineering is one of our core capabilities, be it application-specific subsea instruments and software or, as in the example on page 26, a new anti-trawl seabed transponder frame for a monitoring project being conducted by Brunei Shell Petroleum.

Of course we have all the usual features including Kit, the latest news from our international regions and our help and advice section where our support team provide the answers to your technology queries.

That’s it for now, but don’t forget you can keep up to date with all the latest Sonardyne news on our website and social media channels.

David Brown Editor

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**SOFTWARE**

### Discover Ranger 2 V4

Version 4 of Ranger 2 USBL system software is now available. This major release includes many capability, productivity and usability improvements such as a revised Navigation Chart for Windows 7, support for iWAND and a new Beacon Wizard with integrated 6G Discovery. Discovery mode automatically detects previously deployed transponders including their configured address and channel. Positions can now be displayed in Latitude/Longitude or US Survey Feet, and for DP users there is a new Array Planning tool, as well as Vessel Reference Points with Watch Circles. Contact support@sonardyne.com for all features and upgrade advice.

### From sensor to screen

SensorView is a new software tool that provides a user-friendly interface to access raw sensor data direct from 6G subsea instruments. It’s the perfect tool for all sorts of survey, construction and remote monitoring applications. SensorView can be used with Fusion and Ranger systems or completely independently using a laptop and suitable transceiver.

### IN DEVELOPMENT

**Pre-calibrated inverted positioning**

GyroiUSBL is a pressure rated Ultra Short Baseline acoustic positioning transceiver for tracking targets in water depths up to 7,000 metres. The system incorporates the precision of Lodestar and HPT technology in a pre-calibrated housing which allows for straight-out-the-box, accurate navigation. GyroiUSBL is best suited for scenarios where tracking from the surface is either not possible or not accurate enough for operations such as navigating amongst complex subsea structures, positioning deep tow streamers or tracking a Tether Management Systems for deep water ROV positioning.

### MOBILE APP

**6G App now available for iOS and Android**

Since its introduction, our Battery Life Estimator app has been well received. We’re pleased to announce that the app is now also available for download on iOS platforms. It estimates the battery life our 6G transponders require for a user defined operational scenario, allowing the user to specify the instrument type together with its navigation and telemetry settings. Based on the information, the app will provide an estimate of the total battery life needed. Download it from iTunes and Google Play.

The rope canister is an optional attachment for LRTs, enabling easy retrieval of items left on the seabed. It works by mooring one end of the rope to an item on the seabed and the other end to the LRT via the canister. As the transponder ascends, the rope is deployed and can then either pull up the item directly or retrieve heavier tag lines. Rope lengths of 75, 120 and 160 metres are available. Order yours from sales@sonardyne.com.
**Pressure Inverted Echo Sounder (PIES)** is a long life sensor logging node that accurately measures the average sound velocity through a column of water from the seabed to the surface. Once deployed via free fall, it transmits a wideband acoustic signal from its stable location on the seabed which is reflected off the sea surface and returns to the seabed where it is then detected by PIES. The resulting data enables two way travel time to be calculated. Go to www.sonardyne.com to find out how PIES can help your subsea survey operations.

**Deployment machine family**

USBL system performance is seriously degraded by poor transceiver mounting and deployment. One size does not fit all, so Sonardyne has developed a family of highly engineered deployment machines suitable for any vessel.

The through-hull, hydraulic machine is ideal for permanent installations and features a stiff, corrosion-resistant pole. Where through-hull deployment is not practical, a through-tube machine is available. Modular pole sections accommodate any length. Finally for temporary installations, the over-the-side pole provides an easy to fit (and remove) solution. Contact your local office to find out how we can fulfil your deployment needs.

**Data logging**

**Know your speed of sound**

Pressure Inverted Echo Sounder (PIES) is a long life sensor logging node that accurately measures the average sound velocity through a column of water from the seabed to the surface. Once deployed via free fall, it transmits a wideband acoustic signal from its stable location on the seabed which is reflected off the sea surface and returns to the seabed where it is then detected by PIES. The resulting data enables two way travel time to be calculated. Go to www.sonardyne.com to find out how PIES can help your subsea survey operations.

**Tracking**

**New HPT for noisy vessels and deep water**

HPT 13000 is the latest addition to Sonardyne’s High Performance Transceiver product family developed for noisy vessels operating in deep water. The large array and advanced multi-element processing enables transponders to be positioned more precisely, more quickly and more robustly due to improvements in signal processing algorithms and array design. When used as part of a complete USBL system such as Marksman or Ranger 2 and tightly integrated with Sonardyne’s Lodestar attitude, heading and inertial navigation sensor, class leading performance in all water depths is achieved. HPT 13000 is also a highly capable acoustic telemetry transceiver.
C-Worker 6 sets sail with GyroUSBL

A collaboration between Sonardyne and ASV Ltd, creators of the C-Worker 6 Autonomous Surface Vehicle, to pioneer a new survey and positioning capability for the offshore industry, has reached a major milestone with the successful completion of sea trials.

Until now, survey tasks requiring the use of USBL positioning technology have been confined to operating equipment from conventional surface ships. This approach can be costly due to high charter rates and the requirement for vessels to loiter for many hours or days whilst survey operations are completed.

Designed and built by ASV in Portsmouth, UK, C-Worker 6 is an unmanned surface platform designed to carry out routine survey operations in collaboration with, but independently from, a mother vessel that is free to concentrate on other tasks many miles away. At nearly six metres in length, it is heavy duty and rugged, and offers over 30 days of continuous operational endurance from a single fuelling. Depending on its mission, C-Worker 6 can be configured with a variety of instrument payloads deployed through a large forward moon pool. One such payload is Sonardyne’s Ranger 2 GyroUSBL, an all-in-one, pre-calibrated acoustic transceiver and high grade motion sensor designed to track underwater targets with the highest levels of precision. The C-Worker 6’s high bandwidth satellite communications equipment enables Ranger 2 and other payloads to be remotely controlled and configured by the survey team onboard the mother ship.

Following the completion of intensive trials and client demonstrations off the UK coast, C-Worker 6 with its GyroUSBL is now heading to the Gulf of Mexico for its first commercial engagement supporting offshore pipeline construction operations.

Thomas Chance, Chairman of ASV Ltd, said: “There is tremendous pull in the industry for a more cost effective alternative to ships for completing certain routine survey and positioning tasks.” He added: “The C-Worker 6 autonomous surface vehicle has been designed specifically to meet this need and, with Ranger 2 GyroUSBL, is a uniquely suited tool for the offshore industry.”

A large central moonpool enables the C-Worker 6 ASV to be configured with a wide range of payloads depending on its mission. For acoustic positioning surveys, the pre-calibrated Ranger 2 GyroUSBL will be deployed and recovered on a hydraulic arm.

Anthony Gleeson appointed new Vice President for Asia

Baseline is pleased to announce the promotion of Anthony Gleeson to Vice President Sonardyne Asia Pte. based in Singapore.

Anthony joined Sonardyne in 2009 and has been highly influential in developing business opportunities in the region. As Sonardyne Asia’s new regional head, Anthony will draw on his experience, industry connections and market knowledge to lead the company into the next stage of expansion. John Ramsden, Sonardyne’s Managing Director said, “We’re delighted Anthony has accepted this position. He is an integral part of our global commercial team, developing opportunities and supporting clients.”

Anthony added: “I’m looking forward to guiding Sonardyne to the next level of success in Asia. We have great technology and a dedicated team so I’m confident we can achieve our goals.”

Innovation

Our People

Anthony Gleeson appointed new Vice President for Asia

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Connect completes first campaign with UTEC

Following the introduction of Sonardyne’s new acoustic metrology software, Connect, offshore survey company UTEC has become the first operator to use the technology on a real world campaign. Developed in conjunction with software engineering company, 4D Nav, Connect was used as the primary tool to collect and process metrology data between two flanges set 30 metres apart in the waters off the East coast of Canada.

Sonardyne Compatt 6 transponders were deployed to form a braced quad for baseline measurements with a high precision depth sensor interfaced to a work class ROV. Using Connect, the survey team collected inclinometer data from the Compatts and pressure data from the ROV sensor whilst also collecting baseline measurements. The process was repeated using Sonardyne’s Fusion 6G LBL acoustic positioning system, allowing the time-of-flight and network adjustment calculations in both packages to be directly compared.

“Connect is designed to assist the user with all stages of a metrology campaign,” explained Peter Major, Survey Manager at Sonardyne. “It eases operator burden and complexity by introducing expert settings, automated data collection scripts and robust reduction of measurement from planning to report. Tailored customer reports are generated with the final results with supporting data and QC, improving the speed and integrity of data processing for acoustic, inertial and implied metrology techniques.”

Jason Peters, General Manager of UTEC US commented, “We processed the data using both traditional spreadsheet methods and Connect, giving us results that agreed very closely. The spoolpiece built using these results was also installed without any problems. Taking part in these projects using the new software is a fantastic opportunity for UTEC and provides us with the ability to introduce more quality control into future metrology operations.”
Leading marine navigation systems group Transas has selected Ranger 2 Pro acoustic position reference technology for use on two newbuild ice-class multi-purpose salvage vessels (MPSVs) commissioned by the Russian Ministry of Transport and developed by the Marine Engineering Bureau. The vessels are currently under construction at Nordic Yards in Germany and will each be fitted with dual Ranger 2 Pro systems, the highest specification available in order to support complex underwater positioning and critical DP station keeping tasks.

In standard USBL configuration, Ranger 2 calculates the position of a vessel relative to an acoustic transponder deployed on the seabed. This data is sent to the DP desk and compared against other reference sensors in order that the vessel can calculate the manoeuvres required to hold position.

In Pro configuration, Ranger 2 adds support for LUSBL positioning. The technique utilises a network of seabed transponders to provide the highest levels of accuracy and accurate range redundancy and is widely installed on vessels where maintaining a reliable vessel position is a critical operational requirement. For this, Transas has additionally specified that each vessel be equipped with dual redundant Ranger equipment. All vessel-mounted hardware is duplicated and interconnected so that failure in any one element will not affect the system’s ability to provide a continuous position output.

Dmitry Lagoutin, General Director of Transas Navigator, Ltd (Transas Group) said, “We have many years of experience in creating integrated onboard systems for ships and a large partner base around the world. As participants of our projects, we invite only reliable manufacturers of marine equipment and technology and choosing Sonardyne products is not accidental. The company offers the most advanced solutions for subsea acoustic positioning systems with an optimal ratio of price and quality.”

Alan MacDonald, Sales Manager at Sonardyne commented, “We have a longstanding relationship with Transas and have been involved in many of their recent installations. Such is the complexity of operations these new vessels are expected to undertake, Ranger 2 Pro was the optimum solution to supply. The redundancy it offers provides complete assurance that the vessels will be able to carry out their important work in all circumstances.”

Ranger 2 Pro will support complex underwater positioning and critical DP station keeping tasks.

Subsea 7 get released with heavy ORTs

Subsea engineering, construction and installation company, Subsea 7, has taken delivery of a consignment of acoustic release transponders along with their heavy duty release frames. The Oceanographic Release Transponders (ORTs) will be used, up to 17 at the same time, to assist with the installation of 20 structures being lowered to the seabed via an offshore construction vessel. Once these are landed, the ORTs will be acoustically commanded to ‘open’ and detach the lifting slings from their load.

Recognised for their reliability, durability and long operating range, ORTs are in service with many scientific, defence and commercial organisations who rely upon them for the deployment and recovery of equipment.

The acoustic releases ordered by Subsea 7 (see page 17) are depth rated to 2,000 metres and suitable for a wide range of mooring and remote release applications. Fitting a Heavy Duty Release Frame increases the safe working load of an ORT up to 7,500 kg so that the heavy loads encountered within offshore construction, salvage and oceanography can be supported.

ORTs are controlled from the surface using a Lightweight Command Unit (LCU). For security of operation, a special coding system provides protection against accidental release by noise or acoustic transmissions from other equipment. Each ORT has its own unique ‘address’ enabling a number of units to be deployed in the same area without risk of interference.
Aberdeen-based subsea installation contractor Bibby Offshore has chosen to invest in two SPRINT subsea inertial navigation systems from Sonardyne to support ROV operations carried out by its new offshore survey business division, Bibby Remote Intervention Ltd (BRIL).

Bibby Offshore will be using SPRINT to assist in a variety of inspection, repair and maintenance surveys using its deep-rated ROV fleet which includes the Quasar MKII. SPRINT is an acoustically aided inertial navigation system for subsea vehicles developed by Sonardyne to extend the operational limits of USBL and dramatically improve the efficiency of LBL positioning systems by using sparse arrays. It makes optimal use of acoustic aiding data and other sensors such as Doppler Velocity Logs (DVLs) and pressure sensors to improve accuracy, precision and integrity in any water depth while reducing operational time and vessel costs.

Robin Longstaff, Survey Manager for BRIL commented, “This purchase is part of a larger investment being made by Bibby Remote Intervention Ltd in a suite of high specification sensors to support ROV survey and inspection operations on our primary ROV support vessel. The Sonardyne SPRINT INS systems will be installed as standard items, thereby increasing the accuracy of all ROV positioning activities. This will provide the immediate key benefits of more efficient data processing and the continued provision of high quality deliverables to our clients.”

Commenting on the sale, Paul Griffiths, Sales Manager at Sonardyne said, “We’re delighted that Bibby Offshore has recognised the benefits of SPRINT and chosen it to aid its growing subsea business activities. This investment reflects Bibby Offshore’s commitment to providing innovative, value added solutions for its customers in the North Sea and further afield.”

Sonardyne has delivered its largest ever order of Sentinel diver detection sonar systems to an undisclosed country in Asia. The Sentinels will be deployed to protect strategically important naval bases across the country and will be configured to provide long range, wide area detection, tracking and classification of underwater threats. Sonardyne will now continue to work closely with the customer during system installation and commissioning of the system.

Sonardyne’s maritime security division has installed a Sentinel Intruder Detection Sonar onboard an offshore drilling platform in the Middle East to protect it against attack from underwater intruders.

The world’s most widely deployed intruder detection sonar, Sentinel detects, tracks and classifies divers and underwater vehicles approaching an asset. Whether it is protecting critical infrastructure, offshore platforms, ports or vessels, Sentinel’s autonomous monitoring capabilities, long range detection and low false alarm rates provide a 360° underwater security solution for any situation.

“Offshore facilities face a significant risk of being attacked and we’re seeing increased interest for our diver detection technology to protect them. Each location presents different operational challenges so we work closely with clients to ensure our systems fulfil their requirements for underwater surveillance,” said Nick Swift, Sonardyne’s Business Manager for Maritime Security. “This particular customer has already indicated that additional Sentinels are required to protect other assets in the same vicinity.”
News Feature

Touchdown monitoring surveys

Technip G1200
South Timbalier/Ewing Bank pipelay project, Gulf of Mexico

To assist with the installation of new pipelines in the South Timbalier/Ewing Bank blocks off the coast of Louisiana, Technip installed a GyroUSBL on the end of the 105-metre long stinger on its rigid pipelay vessel, G1200. Used with Sonardyne’s Ranger 2 USBL tracking system, the technology was used to track an ROV positioned at the pipe touchdown points to ensure that they were being laid within the permitted corridors.

USBL transceivers are routinely deployed through the hull or over-the-side of a vessel, enabling targets to be tracked below, to the side and far behind. However, on a large DP pipelay vessel such as the G1200, a transceiver cannot reliably ‘see’ through the thruster wash created at the rear so touchdown monitoring operations are often conducted by an ROV operating from a survey vessel (equipped with its own USBL system) following on behind. As Technip has proven with GyroUSBL, there is now a viable alternative.

The unit combines Sonardyne’s HPT transceiver and Lodestar Attitude and Heading Reference System in the same assembly and is supplied pre-calibrated to eliminate the mechanical alignment errors seen in conventional USBL setups. These features allow an acoustic transceiver to be sited well away from noise interference, even on a dynamic structure such as a pipelayer’s stinger, and deliver outstanding positioning performance. It also means that a pipelay barge is now able to employ its own ROV to carry out touchdown monitoring, allowing the accompanying survey vessel to get on with another task or eliminating the need for it altogether. This reduces operational time and costs.

“We’ve been incredibly impressed with the accuracy, precision and repeatability provided by Ranger 2 GyroUSBL,” commented Iain Miller, Subsea Intervention Manager for Technip USA. “The success with the stinger-mounted transceiver means that we’re now looking to adopt this novel technique for future pipelay projects worldwide.”

In the last issue of Baseline, we briefly looked at the novel technique of mounting GyroUSBL one step further and explore how leading project management, engineering and construction accuracy of pipeline touchdown monitoring.

Touchdown success
Subsea 7

Seven Borealis, L60/L67 pipelay project, Mexico

When Subsea 7 was awarded the PEMEX L60/L67 pipelay project offshore Ciudad del Carmen, Mexico, those planning the project predicted that the acoustic positioning system performance during touchdown monitoring would be adversely affected by a combination of shallow water (less than 80 metres), long layback to touchdown and thruster-generated aeration. Consequently, collaboration between Subsea 7’s Houston survey team and survey crew on the Seven Borealis, in conjunction with advice from Subsea 7’s Group Survey function, led to the temporary installation of GyroUSBL transceivers on either side of the Seven Borealis stinger tip. This allowed the transceivers to be as close as possible to the ROV while simultaneously being as remote as possible from potential noise interference.

Gyros are factory-calibrated and deliver high performance positioning straight ‘out of the box.’ However, when commissioning a GyroUSBL for the first time, an optional (but recommended) system calibration will re-confirm the mechanical alignment of the Lodestar AHRS to the USBL transceiver array. Values are then fixed and will not change, enabling GyroUSBL to be moved from vessel-to-vessel without any further calibration required.

To test whether there was any positioning difference between a factory-calibrated and vessel-calibrated GyroUSBL, Subsea 7 decided to calibrate only one of its GyroUSBLs. Using the position of a wellhead marked with a transponder as a reference, no significant positioning difference was observed between the two transceivers.

Subsea 7 went onto successfully lay the L60 and L67 pipelines over pre-installed subsea mattresses, assisted by the GyroUSBLs to track the Seven Borealis’ ROV positioned at the touchdown points.

Speaking about the project afterwards, Michel Marrannes, Chief Surveyor for Subsea 7, said, “Throughout the entire operation, Sonardyne’s Ranger 2 GyroUSBL has proven to be a reliable and highly accurate USBL subsea positioning system.”

GyroUSBL is proven to deliver unrivalled levels of accuracy and precision – even when installed on vessels-of-opportunity using temporary deployment poles or as these projects, when mounted on the end of pipelay stingers.

Press with GyroUSBL
A first glance, the capability found with Sonardyne’s new family of low cost acoustic modems – uComm - is something that has been available from the company for some time. After all, most of Sonardyne’s existing acoustic positioning systems, such as the industry-leading Compatt 6 LBL transponder, come with modem functionality built-in for telemetry of acoustic navigation and sensor data. However, if all you need to do is send a packet of data from A to B as simply and as cost effectively as possible, a highly configurable, multi-purpose instrument such as Compatt can be rather like using a sledgehammer to crack a nut.

And this is where uComm differs. It is designed simply for one purpose; to transfer data between the seabed and the surface. uComm requires the user having no prior experience of using acoustic hardware or consideration for the laws of physics by which all acoustic devices must abide. Put a uComm into the water and it will sense its environment...
Sonardyne’s new acoustic modem uComm is designed for the easy, automatic transfer of data from point-to-point without a user needing to understand the complexities of underwater acoustic communications. Writing for Baseline, Sonardyne’s Global Business Manager for Production Subsea Asset Monitoring, Stephen Fasham, presents a guide to the technology and its wide ranging applications.

and intelligently adapt its configuration to ensure data is transferred in each direction as fast, as reliably and as energy efficiently as possible. All this in a cost effective compact format.

**A modem, pure and simple**

In order to achieve the simplicity and ease of use (which are the hallmarks of uComm) at a price point which brings the benefits of Sonardyne’s renowned Wideband 2 spread spectrum signalling techniques within reach of all users, development engineers have scrutinised every element of uComm’s DNA.

As a pure underwater modem, uComm is not designed to be used as part of an acoustic positioning system and is therefore not interoperable with any other Sonardyne platform, most notably 6G. Additionally, in the drive for simplicity, uComm is offered without internal sensors, the intention being that users will connect uComm to their own or third party sensors and instrumentation.

Of course, if your application is more complex, for example requiring built in sensors and/or subsea positioning information, Sonardyne can offer a solution from its extensive 6G instrument range. For high volume requirements a custom engineered solution based on either the Compatt or uComm platform can be offered.

**What you get**

uComm’s feature list includes automated setup and link establishment, error correction techniques, simple to use diagnostic software, an Android configuration app and the ability for anyone to setup and start working with the units straight out of the box with just a quick read-through of the Quick Start guide.

uComm can be used in pairs with a single subsea unit communicating with a topside unit, or multiple subsea units reporting to a single topside unit. Subsea and topside units are identical and can be configured in either role – an important consideration if project finances only stretch as far as a single spare unit.

A typical setup comprising of two modem units will deliver data robustly (RS232 or RS485) at up to 9 kbit/s. As with any acoustic link, the achievable bit rate in the field will ultimately depend upon the condition of the acoustic channel in the operating environment, something that all modem manufacturers must contend with. However,
Underwater acoustic modems

Made for your application
uComm is perfect for environmental monitoring connected to current profilers, temperature and pressure sensors. Data from structural sensors such as strain gauges and vibration sensors can also be transmitted.

Use alone or in a network
uComm can be used in pairs with a single subsea unit communicating with a topside unit, or multiple subsea units reporting to a single topside unit. Subsea and topside units are identical and can be configured in either role.

uComm Android app
Modem identity and serial baud rate is configurable via a dedicated Android app using the supplied Bluetooth interface cable.

General
Sonardyne Wideband™
Data transfer up to 9000 bps
Serial communications (RS333 or RS485)
2,000 metre range
3,000 metre depth rating
Impulse (8 way Female)

Power
Wakeup <3 mW
Active (Rx Data) <60 mW
Peak (Tx Data) <40 W

Construction
211 mm dia x 133 mm
3.5 kg weight in air
Anodised aluminium

Options and Accessories
Clamp or hole mountable
Internal battery
Extended housing (required for internal battery)
Transducer protection cage
Dunking kit

What’s Included
2 x uComm modems
2 x Cable tails (8 way Male)
Bluetooth interface cable
Manual on CD
Printed Quick Start Guide
Storage case

(*) Not G Compatible

Rather than burden the user with having to experiment endlessly with software settings (power, gain etc.) in order to fine tune performance, uComm takes care of everything. In the first instance, it will open up the communications channel and then once data upload commences, actively manage it so that the maximum achievable bitrate for any given moment is always realised.

Active link management also benefits battery life. Maximising bit rate means less transmit time which can provide up to ten times reduction in battery use where the system operates at 9 kbit/s rather than a conservative manual setting of 900 bit/s. Additionally, when conditions allow, transmit power is reduced to the lowest that will reliably transmit data. Finally, uComm's error correction means only damaged data is retransmitted rather than complete messages, again reducing transmit time with consequent power savings. All this can mean that what would have been a three month battery life becomes six months, a year or possibly even more.

The centre point of the range is the omni-directional Medium Frequency unit which is supplied in two compact housing configurations, battery and non-battery. Both are depth rated to 3,000 metres with a typical range of up to 2,000 metres. This launch unit is expected to address the needs of most users although extensions to the range, for example to allow for use at even greater depths, are under review.

Sonardyne’s 40 years+ of experience in deploying subsea equipment is evident in the range of accessories available for uComm. Options include cages to protect expensive transducers from damage, mounting plates and dunker kits to allow deployment from any size boat.

How will you use yours?
Applications for uComm are as varied as the users’ imagination allows! The system can be used for environmental monitoring connected to current profilers, temperature and pressure sensors. Data from structural sensors such as strain gauges and vibration sensors can also be transmitted. The link is full duplex so uComm can also be used to control subsea instrumentation from the topside.

Sea trials and testing
As you would expect from a company with Sonardyne’s reputation for quality, uComm has undergone a rigorous testing programme that began in the factory test tank and moved to Sonardyne’s shallow water proving ground at Plymouth on the UK south coast. In the build-up to...
launching uComm, the company has also been working with a number of partners on independent field tests where uComm is being deployed to collect data in real-world applications.

**Sign up for the Field Evaluation Programme**
Our Field Evaluation Programme is ongoing through the first half of 2014 with (at the time of writing) a limited number of opportunities remaining for qualifying organisations to work with Sonardyne and help ensure uComm is subjected to a rigorous shake-down.

Partners with interesting and challenging applications are invited to suggest how they would use uComm and if selected, Sonardyne is providing uComm units on loan for an agreed period. Self-support is an underlying principle of the uComm ownership experience that starts with a user being able to self-select the right model for their application and carries through to integrating it, mounting it and operating it—all without the need for training or expert guidance. Feedback from the evaluation programme will be monitored to ensure that these objectives are being realised before full scale production commences. For more information about the uComm Field Evaluation Programme, please visit www.sonardyne.com.
New multi-million pound Manufacturing, Testing and Quality facility
Over the last few issues of Baseline, we have reported on the multi-million pound investments made around the world to ensure that Sonardyne has the best infrastructure available to support clients and future growth. This time, we take a look at our new UK manufacturing facility, Fathom House, home to enlarged Production, Testing, Quality and Repair departments, all serviced by new acoustic test tanks and environmental test chambers.

New offices, meeting and training rooms, a large staff canteen and future expansion space have also been created. The intensive refit was completed in just four months, ensuring that manufacturing capacity could be significantly ramped up from the start of 2014 in order to meet increased demand.
Product Focus

Dynamic positioning reference systems

RANGER 2 USBL: The technology behind Ranger 2

Sonardyne has been supplying acoustic position reference systems for dynamically positioned vessels for 21 years. The very first vessel to be equipped with an Ultra-Short Baseline system was the Huafa in 1993, supporting subsea operations in the South China Sea. To mark the occasion, Baseline takes an in-depth look at Ranger 2, the company’s current generation USBL, highlighting the features that set it apart from its rivals and the technologies behind it that enable it to deliver the best position.

Accuracy and Precision

Not all USBLs are the same

USBL systems measure the range and bearing from a vessel-mounted acoustic transceiver to a transponder deployed subsea, but not all USBLs do it with accuracy and precision.

Ranger 2 is proven to deliver both regardless of the water depth, vessel type or operating range. For DP, these are critical factors when considering the capabilities of an acoustic position reference system where the objective is to keep the vessel as stationary as possible.

Ranger’s accurate in that each range and bearing measurement to the reference transponder is close to the true value and precise in that there is little to no difference in the result of each measurement. The high quality and robust output from Ranger 2 ensures that DP desks are able to assign a high level of weighting to the acoustics, aiding vessel station keeping in all conditions.

Standard or Pro?

A simple choice

It is crucial to consider acoustic reference system requirements in their own right rather than merely as a sensor supplied as part of a larger vessel scope of supply. This approach will ensure the equipment being specified is capable of meeting the vessel’s operational requirements. After that, deciding which Ranger 2 system is right for you is a simple one; Standard or Pro.

In Standard configuration, Ranger 2 is able to provide a DP position update at one second intervals in any water depth. Simultaneously, multiple subsea targets can be tracked to beyond 6,000 metres range.

Ranger 2 Standard satisfies the operational requirements of nearly all users.

In Pro configuration, Ranger 2 adds support for Long and Ultra-Short Baseline (LUSBL) acoustic positioning. The technique combines the performance from a Long Baseline (LBL) network of transponders deployed on the seabed, where accuracy is virtually independent of water depth, with the flexibility of USBL. As a result, a Ranger 2 system’s configuration is scalable to efficiently meet the requirements of all applications and water depths.

The robustness and stability of the positioning solution has made Sonardyne LUSBL systems the primary DP reference on many vessel installations, particularly in fields off Brazil and West Africa.

6G and Wideband

The technology behind Ranger 2

Ranger 2 builds on the simplicity and reliability of Sonardyne’s original Ranger system but adds support for 6G (Sixth Generation) acoustic instruments and Wideband 2 signal architecture. These exclusive technologies are proven to deliver robust performance, low cost of ownership, faster subsea operations and hardware that is easier to set up and operate.

Sonardyne USBL technology is installed on a global fleet of DP vessels aiding position keeping in all conditions.
Dual Redundancy

When failure is not an option

Due to the critical nature of the subsea operations they conduct, vessels rated as Class 2 and 3 must have fully redundant DP systems and redundant position reference sensors.

In a Dual Redundant Ranger 2 setup, all vessel-mounted hardware (transceiver, acoustic processor and navigation PC) is duplicated and interconnected so that failure in any one element will not affect the system’s ability to provide a continuous position output to the DP desk.

DP-INS

Independently you can rely on

DP vessels have traditionally relied exclusively on GPS and acoustics as their two primary types of position reference but there is a recognised need amongst operators to complement these references with an alternative technology that would allow safe rejection of position errors in one of the other two reference types. To meet this requirement, Sonardyne now has an inertial navigation-based sensor called DP-INS.

DP-INS combines the complementary characteristics of Wideband 2 acoustic signal technology with high integrity inertial measurements. The resulting output is resilient to acoustic disruptions and completely independent from GPS. The need for only occasional acoustic aiding provides additional operational cost saving benefits by extending transponder life and reducing maintenance operations.

Although optimised for Ranger 2, DP-INS can be used with other acoustic positioning systems.

DP Telegrams

Ranger talks everyone’s language

GE, Kongsberg, Marine Technologies, Navis, Rolls-Royce or Transas. Whichever DP system you currently use or are considering for your new build, Ranger 2 and DP-INS are engineered to be compatible with all of them.

A wide range of industry output DP telegrams are supported as standard including, $GGA, $SSB, HPR300P & 309, HPR418 & BCD, ATS Ascii, Trackpoint II, PSONALL, PSONMEAS, PSONUSBL, PSONDP. And, in case your DP speaks another language, Ranger 2’s and DP-INS’ output can be custom configured to meet your requirements.

Software

Easy to learn. Easy to use

The Ranger 2 user interface was developed in close co-operation and feedback from DPOs. It is both easy and intuitive to use, ensuring users quickly gain confidence in using it. Exploring the menus reveals an extensive array of diagnostic and setup tools to assess and fine tune the performance of the system. Included as
standard are real-time acoustic quality indicators, noise analysis and signal travel time displays.

High Performance Transceiver
A perfect match for your vessel
HPT is a family of high performance, vessel-mounted acoustic transceivers engineered to deliver unrivaled USBL positioning on any vessel. Different transducer array designs are available to provide optimum performance for any given operational scenario including shallow, ultra deep and high noise.

The flat design of the hydrophone array is one of the secrets of its superior performance. Unlike spherical arrays that require hundreds of elements to transmit and receive, HPT uses just a small number of elements with carefully designed ‘null’ points that ignore noise interference.

With a flat array, the effective baseline over which phase is measured is increased, so providing better precision. The difference can be likened to the variation in performance between an SLR camera lens and a camera phone lens.

HPT
More than just a USBL transceiver
HPT’s capabilities extend far beyond its role as a USBL transceiver. As standard it supports LBL and LUSBL operations and can be used as a high speed modem for data retrieval applications. HPTs can even be supplied with an integrated Lodestar attitude heading reference system, eliminating the need for a system calibration. See point 12 ‘GyroUSBL. The ultimate USBL transceiver.’

Through-hull or Through-tube
How will you deploy yours?
The performance obtainable from any USBL is hugely dependent upon how the transceiver is deployed.

Sonardyne’s through-hull hydraulic machine is recommended for permanent installations. It features an extremely stiff pole to eliminate flexing and vibration caused by DP thrusters and can be controlled directly from the DP desk. For large vessels such as heavy lift crane barges, a through-tube machine provides the solution. For temporary installations, a high quality portable over-the-side deployment system is available. It’s practical to transport and install on any vessel whilst still enabling survey grade quality USBL system performance.

Optimised Ranger 2
Get the best from the best
The positioning accuracy obtainable from Ranger 2 can be improved by interfacing the system directly into Lodestar, Sonardyne’s premium quality Attitude and Heading Reference System (AHRS), a configuration known as Optimised Ranger 2.

In Optimised Ranger 2, the Lodestar is co-located with the vessel’s HPT transceiver so that raw USBL range and bearing data can be
simultaneously processed with the Lodestar’s attitude data. This achieves a tightly integrated solution that enables a system accuracy of 0.1% of slant range. An Optimised Ranger 2 is therefore able to meet the positioning specifications of subsea projects that previously may have required the use of alternative acoustic positioning techniques.

**GyroUSBL**

The ultimate USBL transceiver

Conventional USBL transceivers need calibration before use. The process determines the precise mis-alignments and offsets between the acoustic transceiver and the vessel’s own attitude and heading sensor. However, calibration can be a time-consuming exercise as it ideally requires deep water and can involve many hours of vessel manoeuvres.

To eliminate this process and for greater efficiency, Sonardyne has developed a pre-calibrated transceiver called GyroUSBL. The unit integrates a Lodestar AHRS and HPT into a single unit and with the Lodestar in fixed mechanical alignment to the HPT’s acoustic array, its precise alignment can be ‘zeroed’ at the factory.

This means GyroUSBL and Ranger 2 can be quickly mobilised without the need for a lengthy calibration. A simple ‘spin-test’ overhead an existing transponder, can be carried out en-route as a client accuracy verification survey.

**Upgrading**

Out with the old, in with the new

Whether because of performance issues or product obsolescence, when the time comes to upgrade a vessel’s DP acoustic reference to Ranger 2, Sonardyne makes the process as seamless and low risk as possible.

The company’s project teams are highly experienced in replacing systems from all major manufacturers and in nearly all cases, are able to re-use existing deployment machines and gate valves to minimise costs and vessel downtime.

Through careful planning with clients, shipyards and operators, a complete system can be replaced in under 24 hours. Equally for new builds, Sonardyne is able to advise shipyards on where best to locate vessel hardware to ensure optimum system performance.

**Support and Training**

When you invest in Sonardyne, you know that in five years time, your equipment won’t be out of date. Sonardyne’s policy is to support and supply spares for current and previous generation products, meaning that at present 5th and 6th generations are supported throughout, from planning, consultancy and custom engineering through to delivery, commissioning and operator training.

As products near the end of their life, Sonardyne works closely with clients to ensure they have a cost-effective upgrade path, keeping positioning technology current throughout the lifespan of the vessel. Advice and support from Sonardyne is available around the clock to maintain, advise and upgrade. It’s all part of the service.
Shallow water ROV tracking

A leading provider of engineering and underwater services, Global Marine was tasked with the trenching and subsea cable installation for a wind farm in depths of approximately 15 metres, using Sonardyne’s Ranger 2 USBL system to position the ROV carrying out the trenching work. At these depths, noise from the vessel bounces off the seabed and reverberates. Noise varies greatly from one vessel to another so although the transceiver can measure it, it is difficult to determine an accurate level. This noise is picked up by the transceiver, degrading the true signal from the ROV. To address the issues, Global Marine contacted Sonardyne’s Survey Support Group (SSG). After reviewing the data and location, the SSG recommended using the ROV-mounted transponder in Responder mode, removing the need to send an interrogation acoustic signal. "Noise is one of two primary factors which make it difficult to predict the performance of an acoustic tracking system; the more noise there is at the receiver, the less accurate the acoustic positioning will be. Using Responder mode instead means that electrical signals are sent to the ROV via its Tether Management System (TMS) and the only acoustic signal in the water is the response from the ROV's transponder, reducing the likelihood of signal masking," says Ed.

Tracking by (acoustic) sight
The second primary factor affecting positioning is the line of sight between the transponder and the acoustic receivers on the transceiver. “Line of sight is a simple but important issue to consider and it is applicable to anyone undertaking USBL operations,” notes Ed. “An acoustic receiver has to ‘see’ the signal it is to detect and variations in topography and the water column will impact this line. Careful consideration must also be given to the location of the transponder on the ROV. In Global Marine’s case, any tilt or pitch on the ROV beyond just 3.3 degrees would cause the transponder to be masked by the

Noise, the unknown variable
Another challenge associated with shallow water, high elevation tracking – and one that Sonardyne’s customer Global Marine Systems experienced on a recent cable trenching project – is that of noise.
vehicle itself. To rectify this, we suggested the transponder be moved from the front of the ROV to the rear."

A similar issue is that of transceiver directionality. "Sonardyne’s 6G transceivers work in any water depth in the world, from ultra-deep to ultra-shallow, the settings just need optimising to compensate for the varying cone of operation," comments Ed. "Our transceivers track at 90° elevation but to do so accurately, lower frequency channels should be used. Higher frequencies would reduce the cone of operation but improve the precision on bore sight."

**Supporting Global Marine**
Throughout Sonardyne’s history, the company has always had a hands on approach to being involved with its customers’ operations; the customer support team being the first port of call for users needing help. "As well as advising Global Marine from our UK headquarters, engineers visited the vessel to optimise their Ranger 2 for shallow water," recalls Ed. "Once we had accounted for all the environmental challenges and run shallow water tracking tests and a trial trenching operation, our system was chosen for use on the project over the tender-specified technology from another vendor. Performance was proven in just 14.5 metres of water with only 2.9 metres vertical distance between the transceiver and transponder. We also verified the system by tracking over 170 metres horizontal distance in 35 metres of water and over 70 metres in 14.5 metres. Most notably, in shallow water operations on a vessel of this size, the line of sight problem encountered highlights the importance of understanding the physics and geometry of the situation in order to maximise performance. This is something that Sonardyne can always help with."

Sonardyne’s WSM 6 USBL transponder is mounted on Global Marine’s Excaliber ROV. Ranger 2 was then used to track the ROV as it carried out its trenching work. During periods of high noise, Sonardyne’s Survey Support Group recommended using the WSM 6 in responder mode to reduce the likelihood of the signal being masked.
Underwater communications is a fundamental requirement for any application needing to recover data from seafloor observatories and sensors. Whilst acoustic communications has remained the mainstay technology platform for many years, the emergence of high bandwidth, free space optical communications unlocks the possibility of recovering large volumes at unprecedented data transfer rates.

Lumasy, a joint venture between Sonardyne and engineers from the Woods Hole Oceanographic Institution (WHOI), is at the forefront of this technology and in the latest proving trials of BlueComm, the first product to emerge from the venture, scientists from WHOI travelled to the Northeast Pacific to harvest data from two seafloor CORK (Circulation Obviation Retrofit Kit) borehole observatories.

CORK is a seafloor system that is put in place to isolate a borehole from the ocean above, allowing the subsea floor hydrologic system to return to its pre-drill state.

Typically CORKs are instrumented with downhole thermistor strings and pressure sensors along with underwater wet mateable (UWM) connectors for ROVs and submersibles to plug in and download data. CORKs were first installed at a series of boreholes drilled on the flanks of the Juan de Fuca ridge in the early 1990s and one of the CORKs used in this project was the first to be installed, thus representing the longest continuously recording seafloor observatory in the Northeast Pacific.

BlueComm uses an array of high power

BlueComm optical transmitters were mounted on the CORKs to collect sensor data and, upon acoustic command, would prepare for data offload.
light emitting diodes that are rapidly modulated to transmit data. Highly sensitive receivers detect the extremely small light signals in order to decode this data and to present it to the user via an Ethernet link.

BlueComm’s high speed optical data uplink coupled with a low data rate acoustic downlink makes it ideal for applications where high speed data transfer is required in only one direction, such as for extraction of large data volumes from seafloor instrumentation or sensors. Optical data transmission is highly efficient, enabling more than three gigabytes of data to be transferred using only the energy contained in a single Lithium D sized battery cell. Integrated acoustic positioning and communications provides methods for locating the device, waking it up and managing the optical link.

For this project, two CORKs sitting at depths of 2,420 metres and 2,650 metres were fitted with BlueComm optical transmitters in 2012. They were connected to the CORKs and configured for low power ‘sleep mode’, occasionally waking to collect sensor data from the CORK before returning to standby, but all the time awaiting an acoustic command from the returning scientists to fully awaken and prepare for data offload.

The original project plan was for the team to return to the sites in 2013 onboard the R/V Atlantis to upload data using a BlueComm optical modem fitted to a traditional conductivity, temperature and depth recorder (CTD) system lowered from a ship. As part of the cruise, data would also be off-loaded using Woods Hole’s AUV Sentry equipped with its own BlueComm unit. However, due to scheduling conflicts, R/V Atlantis and Sentry were unavailable so the cruise was conducted using a ship of opportunity, the R/V Point Sur, owned by the National Science Foundation.

Point Sur’s CTD system was retro-fitted with BlueComm optical modem hardware and was deployed on a wire once the vessel was stationed above each CORK’s location. Once lowered to a slant range within 100 metres of the first CORK site, a command was sent to wake the transmitter and an acoustic response received. At a slant range of 69 metres, a 10 Mbit/s (megabit per second) optical link was established and 245 Mb of data was retrieved. At the second CORK location, a 10 Mbit/s link was once again established at 61 metres and 252 Mb of data was downloaded. After each download, the acoustic command and control was then used to return the seafloor system to sleep before recovering the CTD.

The first generation automatic file transfer software used on earlier trials required approximately 50 minutes to download the 252 Mb from each CORK location but with the latest developments to the software (tested on this cruise), files were transferred at more than 90% of the optical link capacity. This meant that the same 252 Mb data transfer required less than five minutes to be completed.

The final stage of the trials using the CORKs will see the sensors continuing to collect data until mid-2014 after which the team plans to return to the sites to recreate the data download exercise using Sentry and the latest generation BlueComm hardware and software.

This has been specifically developed for AUV operations to fully automate the download process; a 20 minute loiter/circling AUV flight would be well within current AUV capabilities and allow for the complete optical download of vast amounts of data.
Case Study

Custom engineering for Brunei Shell Petroleum

Sonardyne’s new low-profile seabed frames protect subsea logging nodes and transponders from damage and movement caused by commercial fishing activities. The frame is virtually impossible to knock over or catch, protecting equipment and the valuable survey data it is gathering.

Lifting the lid on wireless data collection in the South China Sea
A long life acoustic monitoring system developed by Sonardyne to detect minute settlement changes in the seafloor has been successfully deployed for Brunei Shell Petroleum (BSP) in the South China Sea. The network of Autonomous Monitoring Transponders (AMTs) has been installed in 45 metres of water to record pressure and temperature at designated intervals.

Structure, pipeline and seabed settlement monitoring is regularly undertaken in life of field surveys to monitor the effects of oil and gas extraction. The challenge is to acquire the data to identify changes over time reliably and cost effectively. In 2013, BSP tasked Sonardyne with creating a custom engineered autonomous monitoring system to identify precise settlement figures for a field off the coast of Brunei. Site surveys revealed a seabed of undulating sand with rock and coral outcrops meaning that special consideration was needed for transponder deployment to prevent them sinking into the seabed and affecting data integrity.

Sonardyne has provided autonomous monitoring systems for many deepwater fields but shallow water operations pose additional challenges such as complex thermoclines and bio-fouling caused by organic materials in the water, both of which can affect equipment endurance and data accuracy. More practical challenges on this project were the likelihood of movement or damage to the transponders caused by trawler activities and commercial fishing.

AMTs precisely and repeatedly measure vertical movements; acquire and log sensor data from internal and external sensors; and wirelessly transmit data on demand at high speed to the surface for immediate analysis. The autonomous functionality of the transponder combined with low power electronics enables it to operate for several years without intervention, eliminating the cost for a vessel and ROV on location.

To protect against fishing and trawling activities, the AMTs were supplied in compact glass sphere housings shrouded within bespoke, low profile frames. Designed and manufactured by Sonardyne, the polypropylene frames provide resistance to snagging as well as corrosion and bio-fouling. The clam shell design features unique ballast points which are filled with concrete once the frames have arrived on location, minimising transport costs and manual handling risks.

Prior to deployment, Sonardyne’s Monitor software configured each AMT to record precise seabed pressure, temperature and salinity hourly with non-critical data such as battery consumption, pitch and roll logged daily. As each transponder was deployed, it was tracked using the vessel’s USBL system and a mini-beacon attached to the crane wire with an ROV used to inspect the as-laid position of the frame on the seabed. In total, four AMTs were deployed whilst a fifth was mounted on a nearby platform by divers.

The team from BSP prepare the seabed transponders for deployment in their frames. Logged data can be acoustically recovered at any time and made available for analysis.

The system is now recording and logging data with a team from BSP periodically returning to the site to acoustically interrogate the AMTs and recover the data using a Sonardyne Dunker 6 transceiver deployed over the side of a vessel. The data is then transmitted to shore to analyse and identify any trends in seafloor deformation.

“Since 2007, AMTs have been deployed for long term settlement and deformation monitoring projects,” said Shaun Dunn, Sonardyne’s Global Business Manager for Exploration. “This latest project has given us another chance to showcase our applications, knowledge and custom engineering capabilities to solve our clients’ subsea challenges.”
ON GLOBAL WATCH WITH SONAR/DYNES’ TSUNAMI DETECTION TECHNOLOGIES

During 2012-13, a team from Sonardyne, Liquid Robotics and NOAA conducted a technology demonstration off the east coast of the United States utilizing a Tsunami Compatt 6 paired with a Liquid Robotics Wave Glider autonomous surface vehicle stationed above. The project was aimed at evaluating the effectiveness of autonomous platforms when working in tandem to remotely gather ocean observation data.

The Tsunami Compatt 6 was deployed in 8,000 feet of water while the Wave Glider patrolled a wide area recording wind, wave, temperature and salinity data. At pre-determined intervals, the Wave Glider returned to the Compatt location and recovered both real-time and logged bottom pressure data using its integrated high speed acoustic modem. The data was then transmitted via satellite to shore-based operators where analysis later revealed the Compatt had recorded a small meteo-tsunami event during the trial. This type of collaboration represents a highly economical and expedient method of evaluating new ocean research technologies.

With around 80% of the world’s tsunamis occurring in the Pacific Ocean, Sonardyne tsunami detection technology was deployed for an early warning network designed to protect Ecuador’s coastal communities. Sonardyne hardware was integrated with a buoy system designed and installed by Mediterraneo Seniles Maritimas (MSM) for INOCAR, the hydrographic service of the Ecuador Navy.

A geologically active area known as the Ring of Fire and home to over three quarters of Earth’s volcanoes, violent tectonic shifts result in regular volcanic eruptions and earthquakes. These can create powerful tsunamis capable of travelling from one side of the Pacific to the other in less than a day. However, those living near areas where large earthquakes occur may find the tsunami waves reaching their shores within minutes.

The system comprises two tsunami detection buoys deployed far off the coast in deep water, each with a Tsunami Compatt on the seabed below. The transponders continuously monitor the ocean for the characteristic water pressure change that indicates a developing tsunami. If a small but continuous change is detected, the Compatt will transmit an emergency warning message via acoustic telemetry up to a surface buoy moored above. The buoy data logger then translates and relays the data via an Iridium satellite link to the authorities so that coastal populations can be alerted. This data is also shared with NOAA’s NDBC and published on its website in real-time.

USA A deployed Tsunami Compatt recorded a small meteo-tsunami event during technology trials.

SOUTH AMERICA Ecuador
Tsunami Compatts deployed into the Ring of Fire

USA East Coast
Autonomous data harvesting from a long life acoustic tsunami sensor

Ecuador Tsunami detection buoys deployed in the Ring of Fire protect Ecuador’s coastal communities from tsunami threats.
In Issue 1 of Baseline, we brought you the first look at Sonardyne’s early warning tsunami system, developed in response to the Boxing Day Tsunami of 2004. In the decade following, engineers have continued to expand and refine Sonardyne’s tsunami detection capability which now includes wired as well as wireless solutions. Baseline examines some of these installations in action.

**MEDITERRANEAN East Coast**
A total wired tsunami sensor delivering real-time detection and response

In 2011, Sonardyne delivered Bottom Pressure Recorders for incorporation into a prototype advanced warning system for the Mediterranean. The system differs from acoustic warning systems due to the confined, seismically active nature of the region which could result in a tsunami hitting the coast within an hour of a seismic event. This system therefore needed to be cabled directly to shore so authorities could be alerted immediately.

The Bottom Pressure Recorders constantly measure seawater pressure using an internal high-specification quartz transducer. It employs a NOAA-developed detection algorithm which uses the previous three hours of data to predict the tidal change in pressure. The unit only triggers an ‘Event’ alarm if two consecutive readings deviate from the predicted range by more than the preset threshold. Once triggered, the next 180 messages indicate that an ‘Event’ has been triggered. After three hours, the instrument returns to ‘Normal Reporting’ mode automatically.

The unit receives DC power via the external connector and sends automatic readings via a 10Base-T network link every minute, or when an Event is detected, to a shore-based control centre.

**INDIA Bay of Bengal**
A deep ocean, long endurance wireless monitoring system

In 2007, Sonardyne supplied two tsunami systems installed in the Bay of Bengal in 3,500 metres of water which are operated by the National Institute of Ocean Technology of India (NIOT).

The core of the system is the renowned Compatt transponder, the workhorse of the offshore survey and construction industry, adapted to detect changes in sea level that can follow an undersea earthquake. Even a minute change in water level can result in a damaging wave hitting landfall.

Multiple Tsunami Compatts are now deployed around the Indian Ocean, establishing a wide area, long range early warning network. Data is passed via acoustic links and satellite communications to the onshore monitoring centre at NIOT in Chennai and shared with the NOAA National Data Buoy Centre (NDBC) in the USA. The Compatts have detected multiple seismic events with one measuring 7.9 magnitude on the Richter Scale. Two further buoys will soon be added to the network with one connected to India’s INSAT meteorological satellite.

**India**
A wide area network of Tsunami Compatts in the IndianOcean provide early tsunami warnings for the Bay of Bengal.
Increased demand
The last quarter has seen a continuing rise in demand for 6G technologies. Demand for Ranger 2 USBL remains high with positive feedback from customers due to simplicity of operation and installation. This is primarily in the Construction/Survey and DP reference market sector which is forecast to continue in growth over the next year. Additionally we have received a substantial order for an acoustic control system for BOP monitoring and a positioning system for a large OSV which will use GyroUSBL to position the turret buoy and mooring lines.

Wireless communications
Subsea telemetry applications and data logging are now prime areas where our customers have developed novel methods of using our core technology. Major oil companies and academic institutions are using vessels of opportunity and autonomous surface platforms to retrieve large amounts of data stored on the seabed for analysis and processing thanks to the increased capabilities afforded by the increased data rate and robustness of our Wideband 2 digital signals.

Ready, steady, service
Our pre- and post-deployment equipment preparation service is now fully operational. Simply bring in your LBL hardware for a full Sonardyne service and calibration to ensure it fulfils the requirements of your next project.

Growth continues
Sonardyne Brazil is looking forward to continued strong growth in 2014 with a big emphasis on field development and construction work in the Pre-Salt fields. In both drilling and survey markets, there’s an increased demand for our integrated inertial solutions with Petrobras’ P-23 now operational with Dual DP-INS and Axiom – the inertially-aided GNSS position reference developed in co-operation with Veripos. The next rig installation is Brasdril’s Ocean Alliance for Marksman and DP-INS systems.

The systems of choice
For many survey vessels in the region, Lodestar-based systems are now being specified for an increasing number of projects. The installation of Lodestar AHRS for Optimised USBL and Lodestar SPRINT on the CBO Isabella is planned for March whilst C-Innovation also continues its investment with multiple Ranger 2 and Lodestar equipped vessels.

Higher standards for you
So that we can offer our clients the highest standards, we are currently working towards ISO 9001 and OHSAS 18001. Certification is rigorous but we hope to achieve our goal by mid-2014.

What’s big for 2014?
As we leave behind a record 2013 and start an even bigger 2014, 6G technology is now specified on nearly all projects planned for our region. We’re also seeing many 5th Generation users switching to 6G via our upgrade programme. North Sea and West Africa activity is especially buoyant with our Fusion LBL, Ranger 2 USBL and sensor monitoring platforms being requested for all manner of subsea operations, proving that 6G is here to stay. We’re also anticipating an even bigger year for SPRINT, GyroUSBL and GyroCompatt as the products of choice for some of the deeper, harsher environments our clients explore.
Your questions answered

Ask the Team

Customer Services Manager, Darren Taylor and his team are the front line of Sonardyne’s customer support network. If you have a question, they can give you the answer.

Contact support@sonardyne.com with all your non-urgent technical questions for a fast response from Customer Support. For emergency assistance offshore, please contact Sonardyne’s 24hr helpline: +44 (0)1252 877600

Do you have software to evaluate the performance of an LBL array at the planning stage?

Yes we have in house software to compute the coverage, precision and reliability of a given array. If you email survey@sonardyne.com with the array drop coordinates, DTM (digital terrain model), sound speed profile and information relating to the mounting of the transponders then they will perform the analysis for you.

Has anyone ever installed an echosounder and Ranger USBL transceiver directly beside each other? Would this work?

Your echosounder could affect USBL performance so use the Acoustic Signal Analysis and Noise Plot tools available in Ranger to identify potential issues. The Signal Analysis Tool allows you to identify and diagnose ‘False Detections’ caused by the echosounder and to then take steps to minimise this. The Noise Plot Tool allows you to analyse the background noise to which the USBL transceiver is exposed. Take various noise profiles under different operating configurations, for example, with the echosounder on and off. These will give you a good idea of the power and gain settings to use, the maximum range you can expect to achieve and the beacon power settings. If you are in any doubt, please feel free to send through the screenshots and we will look at them.

Is there a ‘Master Code’ to release a Lightweight Release Transponder if you have forgotten the address it was programmed to respond to?

As security against accidental release, LRTs are programmed with a unique address chosen by the user. The factory default is 5-5 so try that first, otherwise consider trawling. Hopefully you recorded your GPS drop point.

Hello. Can you recommend any floatation equipment for deploying an ORT moored to a tidal gauge?

We can’t make specific recommendations regarding floatation devices other than stating the ORT’s weight in water. Add this figure to the weight in water of your payload and sinker weight then multiply several times. This figure is the amount of upthrust your floatation needs to generate.

Hi. We’re installing a suction pile with two Compatt 6s on top of it. We understand how to integrate the two in Fusion in order to derive one position but is it possible to position each independently within the same array and send each positioning out of Fusion to our navigation software?

If you add two Compatts to a vehicle, these will both be used to track the vehicle as long as they have appropriate references. If you wish to track the two independently (i.e. no knowledge of the fact they are mounted on the same structure and constrained by a known distance), we would suggest creating two vehicles (structures) and add a Compatt to each. Then you can track both simultaneously within the same array. Tracking two independent vehicles is mathematically different to tracking one with two Compatts mounted so you may see variation in the position differences.

Ranger’s Acoustic Signal Analysis and Noise Plot tools allow users to optimise system performance.
LODESTAR

THIS IS THE VERSION YOU NEED FOR VEHICLE AHRS

THIS IS THE VERSION YOU NEED FOR USBL AIDED INS

THIS IS THE VERSION YOU NEED FOR LBL AIDED INS

SPOT THE DIFFERENCE?
(ANSWER BELOW).

There isn’t one. Lodestar has been developed with flexibility and expandability by design. Upgrade capability when you need.

Discover more at www.sonardyne.com