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From off Norway’s continental shelf to the ultra-deep waters offshore West Africa, Brazil and the Gulf of Mexico, Sonardyne Wideband® acoustic technology has arrived. Offering precise subsea positioning for simultaneous operations, robust through water communications and high security wireless control, Wideband addresses the contemporary requirements of the offshore survey, construction and drilling industries in all water depths. Serving more field developments than any other manufacturer, Sonardyne Wideband® offers a proven, low risk solution to a step change in performance. Is your next project ready for departure without it?

www.sonardyne.com/products
The fourth edition of Baseline marks the second anniversary of Sonardyne introducing a regular magazine to keep our customers and industry partners informed about our technology and our capabilities. Circulation has expanded to more than 10,000 copies and we hope that you continue to enjoy the mixture of features, news and interviews.

Our news section is dominated by the success of Ranger USBL and Lodestar AHRS. From tracking ROVs in near 5,000 metres of water off Hawaii to positioning DP vessels in Malaysia, these systems deliver the ultimate survey grade positioning performance. “This is the best acoustic system that I have ever seen,” quoted Carl Close from Sonsub on page 05.

Infrastructure and investment for the future have been a key priority over the last 12 months. Globally, we have expanded, relocated or refurbished all of our facilities, ensuring that through 2009 and beyond, we can build upon our reputation for offering the highest levels of support in the industry.

On page 12 there’s an interview with the team behind Marksman LUSBL, our latest product for the DP drilling market which offers valuable cost saving benefits for operators.

Since the last issue of Baseline, Sonardyne’s Survey Support Group has been travelling the world providing offshore support, office-based training and user workshops. They have also been busy writing white papers and in the first in a new series for Baseline, Edd Moller takes a look at the complex world of acoustic metrology.

As always, we are interested in receiving your news and photos of Sonardyne equipment in action for the next issue so please get in touch. Until then, all the best,

Rob Balloch, Marketing Director
Lodestar has become the first marine ring laser gyro Attitude and Heading Reference System (AHRS) using “strapdown” inertial sensors to receive the Wheelmark approval. Such sensors are rigidly strapped down, or attached, to the body of the unit resulting in size and weight reductions, lower cost, and greater reliability.

The Wheelmark is the European standard that confirms it has been designed and approved to meet performance standards of the IMO (International Maritime Organisation). The certification followed an intensive testing programme and now enables ship operators to use the gyro compass output of the Lodestar for a range of applications. These can include primary navigation and as a feed for helm, autopilot, radar and ECDIS (Electronic Chart Display and Information System). This is expected to prove particularly attractive to the operators of ships and offshore vessels that need high standards of heading accuracy for a variety of applications in the subsea construction and survey sectors.

In addition to providing highly accurate vessel heading, Lodestar is also a single, cost efficient, source for heave, roll and pitch data. This can be applied to Dynamic Positioning systems (DP), helideck monitoring and compensation for multi-beam sonar and acoustic positioning systems. Compared to older generations of mechanical gyros, Lodestar offers substantial through-life cost savings with dramatically increased MTBF and lower calibration and servicing costs.

Lodestar is a solid state AHRS incorporating six sensing elements, three ring laser gyro (RLG) and three linear accelerometers. It is an extension of the Sonardyne product range and was developed for seamless integration with the company’s widely used LBL (Long BaseLine) and USBL (Ultra-Short BaseLine) acoustic positioning systems. Lodestar is upgradeable to a full Inertial Navigation System (INS) providing position, velocity, orientation and angular velocity at high update rates.
ORDERS AND CONTRACTS

Lodestar+Ranger: Miclyn choose the perfect USBL

Miclyn Express Offshore, one of the leading providers of offshore vessels in the Asia region, has again chosen Sonardyne to supply the optimal USBL package available in the market today.

Comprising a Ranger-Pro Ultra-Short Baseline positioning package integrated with a high precision (and INS upgradeable) Lodestar AHRS sensor, Miclyn’s latest fleet of 70 metre multi-purpose DP2 vessels can now dynamically position in much deeper waters than was previously possible while, simultaneously, providing precise positioning for ROVs and towfish.

Miclyn’s Chief Operating Officer, Mr Darren Ang, noted that, “Sonardyne is instantly recognised amongst our key clients as the top subsea acoustic positioning provider and is therefore the ideal choice for our fleet, both for performance, as well as vessel marketability.”

With full IMO approval Lodestar, together with the Ranger-Pro system, integrates seamlessly with the onboard DP system. On performance, Mr Carl Close from Sonsub in Singapore (currently chartering the Miclyn Endurance) commented, “This is the best acoustic system that I have ever seen.”

ORDERS AND CONTRACTS

Seatronics order first rental subsea Lodestars

Marine equipment rental company Seatronics has placed a £2 million order with Sonardyne for a range of acoustic positioning and navigation products. These include Ranger and Scout USBL positioning systems, Wideband RovNav 5 transceivers and three subsea Lodestar AHRS units.

The equipment will be made available through Seatronics’s rental pools in Aberdeen, Abu Dhabi, Houston, New Iberia and Singapore.

The Rangers and subsea Lodestars will be used together to provide an optimised USBL acoustic positioning solution for ROV operations and DP reference.

In deep water, the accuracy of the motion systems used to compensate USBL data is one of the most critical factors. Lodestar is more than 10 times the accuracy of many typical motion sensors. It provides exceptional pitch, roll and heave data, essential for deep water construction survey operations.

Mr Darren Ang, Seatronics’s Vice President in Singapore, said, “We are particularly excited to be the first company in Asia to make subsea Lodestars available for rent.”

ORDERS AND CONTRACTS

Fusion and Ranger for RSVs

Sonardyne has strengthened its position as the leading supplier of Wideband acoustic positioning technology in Brazil with the sale of Fusion USBL, Ranger-Pro USBL and Fusion LBL systems to vessel owner and operator Companhia Brasileira de Offshore.

The Sonardyne systems have been installed on the two ROV support vessels CBO Rio and CBO Campos which are operating on long term charter to oil major Petrobras. Each vessel is required to have two independent acoustic positioning systems so that operations can continue in the event of a single system failure.

The combination of Fusion USBL and Ranger-Pro is recognised as the optimum solution for deep water DP and construction survey, being easy to learn, set up and operate. Wideband systems like Fusion are widely used in the region as they offer precise subsea positioning and are adaptable to field development scenarios where multiple vessels are required to conduct simultaneous subsea operations. These were key factors in Petrobras’s and CBO’s decision to specify the Sonardyne technology and feedback already received from the field reports that performance is “second to none.”

The order included the supply of Sonardyne through-hull deployment machines to optimise the performance from the acoustic hardware.
DEEP WATER TRIALS

A Ranger USBL system has provided impressive performance for the engineers from the Deep Submergence Laboratory of Woods Hole Oceanographic Institution (WHOI) when it accurately tracked the Jason remotely operated vehicle down to the seabed in 4,700 metres of water. The recent demonstration was carried out from onboard the R/V Thomas G Thompson in the Pacific Ocean off Hawaii where Woods Hole researchers regularly conduct deep ocean research cruises.

Jason is a two-body ROV system designed and built by WHOI’s Deep Submergence Laboratory. A 10 kilometre (6 mile) fibre-optic umbilical delivers electrical power and commands from the ship through Medea and down to Jason, which then returns data and live video imagery. Medea serves as a shock absorber, buffering Jason from the movements of the ship, while providing lighting and a bird’s eye view of the ROV during seafloor operations.

On route to the trials site, a Sonardyne engineer had equipped Jason with an AvTrak 2 transceiver and Medea, with a directional Compatt 5 transponder. AvTrak 2 combines the functions of transponder, transceiver and telemetry link in one low power acoustic instrument that has been designed to meet the requirements of a variety of mission scenarios and vehicle types.

Onboard the Thomas G Thompson, a Sonardyne 8023 Big Head surface transceiver, specifically developed for ultra deep target tracking, was deployed on a temporary pole over the side of the vessel. During the deep water dive to almost 5,000 metres, the Sonardyne system was able to achieve a positioning accuracy of 0.33% of slant range, or +/-15 metres, despite the temporary, relatively flexible, over-the-side pole. This performance proved almost as good as WHOI’s existing tracking system and far more convenient to use as no seabed transponders had to be deployed first. In addition, Jason’s position could be updated at 1 Hz despite the water depth which helped with visualisation of the ROV’s dynamics.

AvTrak 2 was installed on the ROV to demonstrate the unit’s Wideband positioning and bi-directional wireless communications capability as if it were an AUV or manned submersible. This proved that data and commands could be reliably and easily sent from the USBL system on the vessel and back again using SMS (Sonardyne Messaging Service) in ultra deep water.

Because the Ranger USBL system had shown its capabilities so convincingly, the WHOI team subsequently had the confidence to use it as the primary positioning tool for two further research dives to 2,500 metres that they conducted shortly afterwards.

During the deep water dive to almost 5,000 metres, Ranger was able to achieve a positioning accuracy of 0.32% of slant range, or +/-15 metres.
INTERNATIONAL

Offices expand capabilities

Sonardyne’s overseas offices have had a busy few months relocating their business operations to new, larger premises.

In December, the Singapore office moved across the road from their home of more than 10 years to a new, 9,100sq feet building. The well appointed facility combines modern office space, workshop with test tank, warehousing and customer training room.

Completed in January, Houston’s new 11,500sq feet base is almost twice the size of their previous location. The extra space affords them much needed room for equipment servicing, offices, warehousing and test tank facilities.

By the end of 2009, Brazil’s purpose-built office will be close to completion. In the meantime, floor space has been gained by moving to a larger floor in their existing building.

Commenting on the recent moves, Managing Director, Barry Clutton said, “The investment we have made into new facilities ensures that Sonardyne has the right resources in the right places to best serve the needs of our customers and their business activities, now and for the foreseeable future.”

The new Sonardyne offices locations can be found at www.sonardyne.com

The latest contracts for Sonardyne’s Sentinel Intruder Detection Sonar (IDS) system have been announced.

Following on from successful fleet trials at the end of 2008, the Naval Underwater Warfare Center in Newport, Rhode Island, USA has placed an additional contract on behalf of the US Navy for the supply of another Sentinel system. The new contract adds to the number of units deployed and operational in the field.

The Slovenian Navy will take delivery of a Sentinel during the first quarter of 2009 for the protection of key installations in the Mediterranean. The navy evaluated numerous technologies with support from NATO in the Summer of 2008. The contract also includes the provision of a Sonardyne underwater loudhailer called ‘Sylla’. This new option for a Sentinel system allows users to broadcast underwater warning messages to deter intruders once they have been detected.

Sentinel’s combination of performance, value, handling and ease of operation has set new benchmarks for underwater protection. The system’s automatic detection, tracking and classification software has demonstrated in various subsea environments the ability to reliably detect threats, determine threat levels, classify targets and ignore false alarms.

Swire Pacific Offshore Operations (Pte) Ltd., has opened a dedicated Marine Training Centre at Loyang, in Singapore and has chosen Sonardyne to supply a Ranger USBL positioning system for its cutting-edge, full-mission bridge simulator. The new centre is the most advanced in the offshore industry and the first of its kind in Asia, with the capability to fully simulate the working environment of an offshore support vessel in a safe, well-managed setting onshore.

TRAINING AND SUPPORT

The small Sentinel sonar head is easily deployed from small patrol boats like this.
Almost 20 years have passed since a Sonardyne acoustic reference system was first interfaced to a Converteam dynamic positioning system. More than 150 vessel installations later and with forward orders out to 2012, the close working relationship between the two companies is as strong as ever. Baseline looks back at two decades of success.
The role of a Dynamic Positioning (DP) system is to keep a vessel in the same location or following a specified course in spite of the effects of wind, waves, the current and other forces acting upon it. To do this, the DP system drives thrusters, propellers and rudders to keep the vessel in the desired spot or on the same heading.

In order for the DP system to know where the vessel is and how it is moving, onboard vessel sensors and external position reference equipment feed data into the DP which then generates the appropriate movement response.

“Subsea position referencing is where we come in,” explained Richard Binks, Sonardyne’s Sales Director, during a recent trip to meet with technical and commercial teams at Converteam, a leading manufacturer of DP, automation, power and propulsion systems.

"Our acoustics tell the DP where the vessel is relative to the seabed or other object; this complements other position information such as GPS. The DP system then decides what it has to do in order to keep the vessel in the right position."

Neddrill 2

Like any successful relationship, it is easy to remember where it all began. For Sonardyne and Converteam, it was Spring 1992 aboard the Neddrill 2 drillship working off Brazil.

“Drillships like the Neddrill 2 have critical DP requirements as they need to remain stationary over a well to which they are connected with a drilling riser. There are expensive consequences if any stresses are exceeded and system redundancy is required at all levels so that vessel operations can continue in the event of a single equipment failure,” said Richard.

This initial installation on Neddrill 2 was an outstanding success and it is still operating a Sonardyne/Converteam solution today.”

In the offshore sector, Converteam manufacture world class Dynamic Positioning, automation, power and propulsion systems for the world’s deep water drilling and support vessel market. Fully pictured (left to right) Spencer Collins, Allen Meahan (Converteam), Richard Binks and Jon Parker.
requirements for DP and acoustics as the offshore industry moved into ever deeper waters.

In the late 1980s and early 1990s, Long and Short Baseline (USBL) was a primary acoustic positioning method for DP reference. The system used four, hull-mounted transducers sited in each corner of the vessel to gather acoustic range data from seabed transponders. It was accurate and performed well in deep water but suitable only for vessels that could accommodate four through-hull transducers with sufficient distance between them.

At the same time, Sonardyne was in advanced development of its Ultra-Short Baseline (USBL) technology which utilises a single, multielement transceiver to calculate both range and bearing from in-water transponders. Sonardyne’s unique USBL design is able to reject noise interference generated by vessel thrusters resulting in very stable and is able to reject noise interference generated by vessel thrusters resulting in very stable and precise DP reference. The system is designed to be accurate and consistent even in complex acoustic environments.

**New Opportunities**

The offshore industry’s rapid acceptance of USBL as a positioning method opened up a wealth of new opportunities for Sonardyne and Converteam, simple DP reference and target tracking for survey and support vessels while for drilling and production vessels, higher accuracy Long and Ultra-Short Baseline (LUSBL) positioning using a seabed array of transponders.

The first USBL system supplied to Converteam (who at the time were called Ciegelec) was in 1993 for the Swire Pacific Constructor, a dive support vessel working offshore Brunei. Close cooperation between each company’s software engineering teams ensured a complete understanding of the requirements of the DPS902 DP system and that the Sonardyne USBL outputted the correct data strings.

“‘The Pacific Constructor is another early Sonardyne/Converteam success story,” commented Richard. “Since that first installation, we have commissioned over 20 other vessels for Swire. In 2008, Swire made the decision to upgrade, fleet-wide, the USBL systems to the latest Wideband specification. This will greatly enhance the role of the vessels when operating in complex, acoustically congested field environments.”

**Close Co-operation**

Accompanying Richard on the trip to Converteam’s headquarters in Rugby, England, was Senior Engineer, Jon Parker and Senior Vice President for Strategic Sales, Spencer Collins, both of whom have been heavily involved in the technical and commercial success of Sonardyne’s technology for DP.

“We are in contact with Converteam on a regular basis, to discuss market requirements, and new product developments,” said Spencer. “A key topic on the current agenda is a review on how our new Lodestar inertial navigation technology could be integrated into the DP.”

Neil Barford, Business Manager, Offshore and Merchant for Converteam UK commented, “When we select partners to supply critical components such as the hydro-acoustic element of our DP control system, we need to be sure that we make the best choice for our customer. As a DP supplier with over 30 years’ experience, we are very comfortable when we choose Sonardyne; we know the products and the people and we trust them.”

“Customers recognise they are getting the best integrated solution for both DP and acoustics,” added Jon. “Our joint track record speaks for itself with many operators having decided to standardise on a Sonardyne/Converteam solution across their fleets.”

Noble Drilling, Bourbon (see opposite) and Swire are all examples of fleet-wide standardisation. Similarly, the build programme for all three of the Fifth Generation Sedco class of vessels in 1996, commissioned a Sonardyne/Converteam package. One of these rigs, the Sedco Express went on to upgrade to Wideband USBL prior to departing for operations in BP’s Block 18 off Angola. The upgrade took less than 24 hours and was supported by Sonardyne’s Brazil office.

**Local Support**

Indeed, local support has been of key importance to the growth and success of both companies. 24/7 product helplines and regional offices with offshore engineers “on the ground” has allowed customers to invest in new systems confident in the fact that maintenance, training and field support are on the doorstep.

“Brazil is particularly good example of how we support a local customer such as Noble Drilling,” noted Spencer. The proximity of Converteam’s office to ours allows field engineers to coordinate their activities and resolve any technical issues face to face.”

“Ironically, a recent order involves an upgrade to the Noble Roger Eason to the latest generation DP and Wideband acoustics.” Asked about the connection, Richard said, “The Noble Roger Eason used to be called the Neddrill 2 – the very vessel where the partnership between Sonardyne and Converteam began all those years ago.”

Further testament to the success of both companies is the order of a Triplex DP and Wideband Dual USBL system for the Noble Globrrotter drillship. This is a state of the art ‘Huisdrill 10,000’ design being built by STX of Korea and is just the latest in a run of orders received from Korean yards for new-build drilling vessels.

**Petrobras**

Selected Sonardyne/Converteam in 1996 for the P63 drilling semi-submersible. The system was upgraded to Wideband acoustics and the latest A series DP deck in 2008.

**Noble Drilling**

Equipped the Muravlenko with an USBL system in 1996 and then in 1998, the Noble Paul Wolff with a Converteam DP power and propulsion package and Sonardyne acoustics.

**Seilean**

The world’s first DP FYRO Seilean is reliant on the systems from Sonardyne and Converteam whilst producing from a live well in water depths up to 2000 metres.

**Helix Q4000**

The first vessel to commission a surface BOP in the Gulf of Mexico uses a Wideband BOP control for shut-in and is under the control of a Converteam DP.

**Seacor**

Via Converteam, placed several orders during 2007/08 for Wideband Ranger USBLs in order to enhance the capability of its fleet from supply vessels to multi-role vessels.

**Shipyards**

In 2008, the Sonardyne/Converteam track record generated orders from a number of shipyards including DSME, STX and Jinan of Korea and Yantai Raffles of China.
The latest orders received though Converteam are for 10 Ranger-Pro USBL position reference systems for installation aboard ships currently under construction for Bourbon Offshore. The equipment will be integrated within Converteam’s Class 3, C-Series DP control system and includes a Sonardyne 8023 ‘Big Head’ transceiver and through-hull deployment machine to ensure optimum positioning performance in deep water. Delivery of the Sonardyne systems will be completed by 2012.

Bourbon Offshore operates one of the most up-to-date and versatile offshore fleets and is currently engaged in a major shipbuilding programme having commissioned a substantial number of new vessels in the past 12 months. The Converteam DP and Ranger systems will assist Bourbon to meet the challenges of the deep water offshore market by providing highly stable and reliable position keeping for a range of subsea tasks including ROV inspection, well intervention and repair.

Ranger-Pro USBL for Bourbon ships

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Ranger-Pro is recognised as the optimum solution for deep water acoustic DP reference and construction survey tasks as it is easy to learn, set up and operate.
Marksman LUSBL

Ian Joyce, Jon Parker and the Marksman development team (clockwise from top): Hayden Whincup, James Allen, Gerard Renwick, Keven Cook, Dave Wolfe, Glynn Morgan and Robert Iles.
Pick any deep water field in the world and chances are Sonardyne LUSBL technology will be somewhere at work providing positioning for drilling operations. Baseline talks to Ian Joyce and Jon Parker, the architects behind the company’s latest LUSBL product development Marksman.
technology, ease of use is at the top of the agenda for operators of acoustic positioning systems. All technology designers must now realise that customers expect to use their products without memorising a weighty manual,” emphasises Ian.

The five-day training course needed to operate Sonardyne’s previous LUSBL was a daunting prospect for many DP Operators (DPOs); one which many on the team believed could be drastically reduced. And they were right. Thanks to the lateral thinking and careful design that has gone into Marksman, operator training has plunged from days to hours. According to Ian, “We have taken away some of the mystery behind acoustics so that an experienced DPO can learn to use Marksman with confidence after only a few hours’ tuition.”

Evidence of this approach is echoed in the layout of the Marksman user interface (see opposite) which has also been designed to enable safer and more responsive operation. Important information and messages are visible from some distance away and touch screen operation enables a swift response if the need arises.

The higher performance of Marksman LUSBL is down to the inclusion of Sonardyne’s acclaimed Wideband signal technology which introduces a new host of benefits for LUSBL operations.

Wideband signals are generated through the modulation of carrier frequencies using digital codes. Separation of signals in both frequency and code greatly extends the number of unique signals that can be supported within a defined bandwidth. This generates hundreds of truly independent navigation channels enabling multiple users to work in the same area without causing acoustic pollution to each other. For example, in 2,000 metres of water, Marksman makes it possible for transponders to be laid within a 250 metre radius of the wellhead. Such reductions mean significant savings in operational costs.

“Setting up a seabed transponder array for a DP rig has traditionally been a costly activity due to the time needed to manoeuvre the vessel to widely spaced locations where the transponders must be deployed,” explains Jon. “This task can take 12 hours or more but the Wideband technology built into Marksman enables transponders to be deployed within the typical operating reach of the rig’s own ROV. This transforms array deployment into a swift and efficient operation.”

“Similar cost savings arise during the calibration of the transponder array,” notes Ian. “The system architecture has been designed to enable a ‘top-down’ technique to be used as the transponders are deployed. This avoids the need to take baseline measurements and permits quick and reliable calibration. The result is the elimination of another costly task.”

For the past few months, Sonardyne’s sea trials centre in Plymouth has been the focus of activity for the Marksman team with Ian and Jon overseeing crucial in-water testing of the software and the new processor platform (Navigation Sensor Hub) on which it runs. Their next milestone is the deployment of the first fully operational system later in 2009, slated for a mobile drilling unit operating in the Gulf of Mexico.

“We shall be upgrading the rig’s existing system and it is expected this can be completed within a day or so,” said Ian. “The vessel already has a Sonardyne digital transceiver installed so it will be a relatively straightforward task to install the new bridge hardware, interface everything to the DP desk, recalibrate the system and go to work.”

Having been part of the team that developed the first Sonardyne LUSBL, Jon Parker is enthusiastic about the impact Marksman will have. “I have been closely involved with these systems for over 15 years and having experienced first hand in Plymouth what Marksman can do, I believe it is as significant a development for the DP drilling industry as when LUSBL first arrived.”

**Shorter Baselines**

With Wideband, ranges are at least three times more precise than previous generation analogue positioning systems meaning that transponder baselines can now be three times shorter.

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Main menus provide access to the Marksman configuration, events and alarms viewers, diagnostic and calibration tools, as well as the user manual.

Reference frame selector offers a choice of position reference frames: World, Vehicle or Beacon depending on the task.

Systems shortcuts are a single click link to commonly used tools.

Chart controls a choice of radar or grid view, north or bow-up, distance measuring tool, zoom in-out and a brightness control to suit ambient light conditions.

System time allows acoustics to be precisely synchronised to UTC for multi-system operation.

Tracking selection uses On/Off toggle buttons to control the selection of targets tracked.

Device status indicators give the status of all the systems input devices at a glance. Green for good and red or amber for action required.

Positions display shows the numeric position and state of each target in a large font easily read from a distance. The colour varies with position age.

Chart display shows all of the vehicles and targets on a choice of radar or grid view that are currently visible in the selected reference frame.

Tracking icons indicate the age, mobility and status of a target.

LUSBL combines the accuracy derived from LBL positioning, where accuracy is virtually independent of depth, with the operational convenience of USBL positioning. With an optimised system, repeatability is typically 0.5 per cent of slant range.
**HE TERM “WINDOW of opportunity” might have been invented for Russian survey teams working in the Arctic north. The phrase summarises the few weeks in summer when the sea ice retreats and temperatures rise grudgingly above freezing to settle at around 10 degrees Centigrade. This is the time when crews from the largest marine geophysical company in Russia, SMNG (Sevmorneftegeofizika), sail into a wilderness where there is nothing but water, rock and tundra for hundreds of miles.**

The region is blanketed by ice and snow until early July when the small fleet of boats operated by SMNG is able to leave the town of Salekhard and follow the River Ob northwards into the Kara Sea. The company is working on a multi-year project for one of Russia’s leading oil and gas companies surveying hydrocarbon prospects far into the Obskaja Guba, which is in the Yamal-Nenets Autonomous district and part of the massive western Siberian plain.

Crews only have until the end of October before the temperature plunges back far below zero and the driving snow and ice return to trap any wayward ships. The remoteness of the survey area demands an exceptional level of planning, equipment reliability and commitment as everything the crew needs for the four months ahead must accompany it from Salekhard.

One of the most recent additions to the survey crew’s inventory is a Sonardyne OBC (Ocean Bottom Cable) seismic positioning system.

SMNG typically deploy seismic cables containing thousands of hydrophones. Small, low-cost acoustic transponders are attached to these cables at regular intervals to provide highly accurate positioning of the ground stations.

The cables are laid from small, long-alloy boats specially designed and certified to cope with the cold, rough weather. They are equipped with hydraulic winches to aid deployment and recovery of the cables and operate in water that averages between 15 and 17 metres deep although shooting can occasionally take place in as little as 2.5 metres. These are familiar demands for the Sonardyne equipment which has, in other surveys, been used in as little as 1 metre and as deep as 500 metres.

With the cables deployed, a larger shooting vessel passes down the length of each cable, collecting seismic data and separately, via a transceiver deployed over the side of the vessel, multiple acoustic ranges from each transponder. In a carefully orchestrated operation, ‘shot’ cables are then recovered and immediately relaid ahead of the shooting vessel ensuring large areas can be surveyed in a continuous process.

**HydroPos Seismic is the PC software that controls acoustic set up and positioning operations. The software monitors, time tags and logs raw data received from the vessel’s surface navigation systems (GPS, Gyro etc).**
and the Sonardyne acoustic transceiver. All raw and processed data is stored in a single file to allow easy archiving and transfer of all survey data. Various industry standard reports are provided for export from the application.

By using the Sonardyne system, the surveyors obtain real-time, absolute positions of the transponders quickly and accurately, making for very efficient surveys. Raw acoustic data can also be passed to an external navigation system for independent final network adjustment.

Denis Tomashin, Chief Geophysicist with the survey crew, was pleased with the performance of the Sonardyne OBC positioning system from the moment his team used it for the first time in 2007. “We have now just completed our second season (2008) and the transponders have been proven to withstand the punishing operational requirements of our project. Overall, the system has shown very good results, even in very shallow water. We have not even lost one transponder; we are delighted,” he said.

An unexpected benefit of having the Sonardyne system available for the survey helped the SMNG team overcome some unique environmental conditions encountered in the region. “The main natural obstruction we met during the survey was the very big change in the tide which affects the stability of the seismic spread. We quickly learned to put a lot of weight on the seismic cables to fix them to the sea bottom. The OBC equipment is a great help in enabling us to see the dynamics of the seismic spread movements,” added Denis.

Productivity begins to fall when the shorter Autumn days reduce the cable boats’ working time. That is when the survey party retreats inland, leaving nothing to show that it was ever there. It is also the time when the SMNG team can begin to plan ahead for the next season’s short but busy work programme.
In the first of a regular series of features written by Sonardyne’s Survey Support Group, Project Surveyor, Edd Moller, provides an introduction to acoustic metrology and explores the advantages of the different techniques used. A copy of the technical white paper on which this article is based, can be requested via the support section of Sonardyne’s website. Details on page 21.

SUBSEA STRUCTURES SUCH AS manifolds and pipelines are connected together on the seabed using sections of pipe (connectors) often called ‘spool pieces’ or ‘jumpers’.

Because you can never guarantee exactly where a structure or the end of a newly laid pipe will end up in relation to another, or know the final orientation that it will be laid, these connectors can only be fabricated at the end of the installation process. They are also made of semi-rigid material due to the pressure and type of material being exported through them requiring them to be fabricated to fit exactly between the structure or pipeline hubs. An exact fit also ensures there is no residual stress in the connector which will reduce its operational life.

In order to fabricate a connector to fit exactly between the hubs on the manifolds and pipeline ends, highly accurate measurements are required between the connecting hubs on the subsea structures. The method of collecting these measurements is called ‘Metrology’.

The word metrology is actually derived from the Greek words ‘metron’ (measure) and ‘logos’ (study of) and can be described as ‘The Scientific Study of Measurement’. Therefore, when metrology is coined in the offshore oil and gas industry, it is often referring to the measurements made in order to construct a subsea spool piece or jumper.

Whilst a number of different techniques are available to conduct metrology, using a Long Baseline (LBL) acoustic system remains the primary technique used by the subsea construction industry.

The History of Acoustic Metrology
Survey companies developed the techniques for conducting acoustic metrology in the 1980s and since then, many thousands of connectors have been successfully made to measure in varying water depths from the shallow plains in the North Sea to the extreme depths of the Gulf of Mexico.

Acoustic metrology was introduced as a cost-effective alternative to taut wire metrology; a technique at the time that utilised divers to take the measurements. The accuracies offered by the acoustic measurements met and often surpassed the ranging accuracies achievable by the taut wire observations and the deployment and recovery of equipment by ROV removed the requirement for divers. This meant that metrology could be completed from a vessel with a considerably lower day rate than a Dive Support Vessel. In addition, the use of an acoustic metrology array also allowed for collection of redundant measurements. This increased the ability to apply quality controls checks and ultimately reduced the risk of the spool or jumper not fitting at all.

Increased Efficiency
In recent years, the introduction of multi-sensor endcaps, more compact housings and Wideband signal technology in Sonardyne’s Compatt 5 transponder has increased the efficiency with which acoustic metrology can be conducted. Although generally the methodology in which the metrology measurements are made has not changed significantly, there are advantages to be gained from the correct use of the technology encompassed within the Compatt 5 and its in-built sensors.

Spool Pieces and Jumpers
The terminology of spool pieces and jumpers can often be confusing. In reality, both of these terms refer to a connector that links between hubs on subsea structures. These connectors can then be divided into two types requiring different metrology measurements. These are horizontal connectors, often referred to as ‘Spool Pieces’, and vertical connectors, often referred to as ‘Jumpers’.
Horizontal connectors are often found on structures in shallow water areas when protection covers are required to cover the structure to protect it from any damage caused by fishing activities such as trawling. Therefore, the connectors will have to exit from the sides of the structures. Vertical connectors inversely will often be found in deep water out of the reach of fishing activities. This allows for the connectors to exit from the top of the structure. Generally, vertical connectors are easier to both measure and fit.

Prior to fabrication, the following information between each of the hubs that the connector will fit between is measured as part of the metrology campaign:

**Horizontal Connectors**
- Horizontal distance
- Vertical angles (difference in elevation)
- Pitch of the two hubs
- Seabed clearance along the route
- Accurate horizontal angles

**Vertical Connectors**
- Horizontal distance
- Vertical angles (difference in elevation)
- Pitch and Roll of the two hubs
- Seabed clearance along the route
- Relative bearing between the two hubs

**Advantages of Acoustic Metrology**
A Sonardyne acoustic metrology system comprises a number of Compatts (seabed transponders) placed in a network on the seabed and also on the structures and/or hubs. Depths of the Compatts are accurately measured and acoustic ranges collected between them. The distance between each Compatt is often referred to as the ‘baseline’. This allows a network adjustment to be performed which positions the Compatts relative to each other.

The network, commonly referred to as an ‘array’, can also be shifted and orientated to match actual grid positions allowing the user to quote real world co-ordinates which can help with quality control checks on known locations.

It is also possible to use the array to
determine acoustic headings on structures and pipelines with an accuracy relating to the positional accuracy of each Compatt and the baseline distance between them.

In recent years the introduction of Wideband signal technology in Sonardyne’s Compatt 5 transponders has had a significant impact on the efficiency with which acoustic metrology can be conducted, regardless of the depth of water. The increased ranging precision offered by Wideband signals means that it is now possible to obtain positional accuracies at MF (Medium Frequency) that were previously obtainable only at EHF (Extra-High Frequency). This has the combined benefits of extending the range of high accuracy positioning and rationalising equipment inventories as the same Compatt can be used for USBL tracking as well as being operated through the USBL hardware.

The main advantages of an acoustic metrology system are:

- Accurate to better than plus/minus 50mm
- Offers redundancy for QC
- Flexible to meet any metrology requirement
- Equipment readily available
- Existing personnel already familiar with the equipment
- Can use existing seabed array
- Multiple metrologies from the same array
- Can be used relative or absolute
- Accuracy not effected by range
- Measurements can be made in little or no visibility
- Results achievable onsite
- Deployable by ROV negating the requirement for a DSV.

As with all systems, there are often some disadvantages. For acoustic metrology, these include the requirement for planning before the campaign which commonly involves dimensional control of structures and metrology equipment and the fabrication of frames, stabs and receptacles to position a Compatt at a known position relative to the hub. In addition, the system may take time to install, can be affected in noisy environments and will require processing to compute the actual connector dimensions from the raw measurements. Yet all of these negative points can be planned for in advance and this is where Sonardyne’s Survey Support Group can help ensure success in the field.

### Relative or Absolute Measurements

Metrology operations are typically conducted in one of two ways; relative or absolute. However, these methods will have to be adapted depending on the exact conditions of the required connector and also take into account any changing environmental conditions. Relative measurements are often performed on vertical connectors as the hubs are easily accessible allowing a Compatt to be mounted directly on the hub itself. This method only requires the deployment of a small bracing array of seabed transponders in order to conduct quality checks.

### Relative Metrology Advantages

- Involves little post processing.
- Sensor error is minimised as the Compatt is located very close to the actual hub.
- Time saving through not having to perform a large array calibration.
- Sufficient redundant observations to enable full quality control when three or more Compatts are used to brace the two hub Compatts (five plus Compatts in total).
- Data can be quickly processed on board to verify results before demobilising the acoustic equipment. This data can also be post processed at a later date and QC’d before the results are sent in.

By installing a transponder array around the metrology area (often pre-installed for installation operations), measurements can then be made in an absolute manner. Installing the array will take longer than a bracing array used when conducting relative measurements but can save time if multiple connectors are required to be calculated. Mobile Compatts can be placed within the array such as in structure receptacles and in straddle brackets over a pipeline which can then be precisely positioned. Using sensors to obtain attitude and depth information and dimensional control reports, hub positions and attitudes can be post calculated. Traditionally this was a laborious exercise but now 3D CAD software can make short work of the task.
Absolute Metrology Advantages

- Often used in horizontal metrology as the hubs may be inaccessible for a Compatt both in terms of available space and also for acoustic line-of-sight.
- Ideal for structures requiring a large number of connectors as the calculation for each connector is conducted in post processing and not during valuable measuring time.
- Required when acoustic hub heading determination is required.
- Can offer results in Real World Co-ordinates often favoured by engineers.
- Data can be quickly processed on board to verify results before demobilising the acoustic equipment.
- As structure installation utilises the same Wideband Medium Frequency Compatts as you would use for metrology, metrology measurements can be calculated from the as-built structure positions and dimensional control reports.

Calculating Results

Due to the varied approaches to acoustic metrology, there are numerous data collection methods. This means that there is not a ‘one size fits all’ computing program to translate measurement observations into computed results.

Sonardyne’s Fusion LBL software can be used to collect observations and can contribute in the processing stages but it is not intended to provide the final engineering solution. Also, although the calculations required to compute a solution are simple, there are often a huge number of them to perform. Often, the calculations are progressive which will propagate any errors throughout the results. Therefore, the calculations should be performed by more than one person and by more than a single spreadsheet, CAD model, adjustment software, etc.

“In recent years, the introduction of multi-sensor endcaps, more compact housings and Wideband signal technology in Sonardyne’s Compatt 5 transponder has increased the efficiency with which acoustic metrology can be conducted...there are advantages to be gained from the correct use of the technology encompassed within the Compatt 5 and its sensors.”

Generally a combination of Sonardyne Fusion software (including internal least squares adjustment program), third party least squares adjustment software, CAD, and manual and spreadsheet calculations will be required to calculate the actual connector dimensions.

Achievable Accuracies

In order to demonstrate the absolute accuracy of Sonardyne Wideband equipment for metrology, controlled trials in a dry dock were carried out in 2006.

Four production standard omni-directional MF Compatt 5 transponders were arranged in the dry dock such that the baselines between pairs of Compatts varied from 10 to 30 metres. Two units were cable connected to calibrated sound speed sensors to provide accurate sound speed monitoring via acoustic telemetry. All the Compatts were loaded with the latest firmware and acoustic observations were collected using Fusion LBL software and a RovNav 5 transceiver.

Independent dimensional control surveys were commissioned to accurately measure the distance between the Compatt transducers. The control surveys were conducted both before flooding and after the water had been drained from the dock using different instrument set up and control points.

The trial results, summarised below, confirmed that the accuracy of baseline measurements using Wideband signals is within the published value of plus/minus 30mm.

It is worth noting that the above results are from trials conducted in a known and stable environment. In reality, changing environmental conditions may yield larger data spreads. Thus Sonardyne would recommend that specifications for measured slant ranges are no tighter than plus/minus 30mm to account for these unknown conditions. BL

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<th>To Compatt (Address)</th>
<th>Range from dimensional control surveys (m)</th>
<th>Range from average of 20 baseline observations (m)</th>
<th>Standard deviation (m)</th>
<th>Computed error (m)</th>
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WHERE IN THE W

Be prepared with Scout: Tracking the success of Sonardyne’s entry level USBL

2008 was a record year for sales of Sonardyne Scout USBL acoustic positioning systems and proof if any was needed, that the system is meeting users’ demands for a simple, easy to use underwater tracking system with high performance.

From the outset, Scout was developed to be easy to install, set up and usable on almost any size of vessel making it the ideal tool for use in relatively shallow inland and coastal waters such as lakes, rivers, harbours and estuaries.

Available in three different models, the system calculates the position of a subsea target by measuring the range and bearing from a vessel transceiver to a transponder fitted on the target. Here are just a few examples of how it is being used.

Location: West Coast USA
Task: ROV tracking
The operator of this 300 metre rated, inshore ROV wanted a fast position update so opted for Scout-Plus with its responder mode feature and equipped the vehicle with a Wideband Sub-Mini transponder.

Location: Gulf of Mexico
Task: Dive support
With the ability to simultaneously track 10 targets and easily install the system on any vessel, Scout-Pro proved the ideal choice for this survey company who needed to precisely track their team of inspection divers.

Location: Brazil and UK
Task: Towfish tracking
Scout systems are frequently supplied with small, lightweight Type 7815 Coastal transponders; perfect when space on a vehicle is limited. As seen in these photos from northern Brazil and London’s River Thames, installation is simple.

How are you using your Scout system? Email marketing@sonardyne.com and let us know.
WORLD IS SCOUT?

positioning system from the West Coast USA, to Europe and on to the Far East

Location: Mediterranean
Task: ROV tracking
Scout’s competitive price provides numerous opportunities for users whose restricted budgets may have prevented them from using USBL technology before. In this example, Scout was used to track an ROV and record waypoints during an archaeological survey.

Location: Caspian Sea
Task: Seismic cable positioning
For ocean bottom cable seismic surveys, Scout-Pro’s fully featured software allows a recording vessel to position the cables in one overhead pass, saving valuable time and money. Here, the system provided excellent results despite very shallow water.

Location: Korea
Task: Civil engineering
A complex tunnel building project in Korea required the use of a Scout-Pro system to provide ROV positioning during the survey phase of the project. Using external reference sensors, better than 0.5% of the slant range from the transceiver to the target can be achieved.

Location: Papua New Guinea
Task: Inland pipe survey
To simplify set up and reduce costs, an integrated motion sensor within Scout transceivers automatically compensates for the dynamic motion of the vessel. This feature is ideal when moving the system from vessel to vessel.

Location: Malaysia
Task: Dam inspection
Portability was the key to success for this video survey of a dam. All Scout systems can be controlled using a Surface Command Unit; a ruggedised, portable PC and sensor interface that enables Scout to be operated independently from almost any type of boat.

Location: Australia
Task: Diver tracking
To independently verify the performance of Sonardyne’s intruder detection sonar, Scout was installed on the trials vessels and divers equipped with Coastal transponders. The simple to use software is designed for users with little or no prior experience of acoustic positioning systems.
Riser Tower Monitoring

When Petrobras’s Cascade and Chinook development comes on stream next year, it will claim two major milestones. Not only will the Floating Production, Storage and Offloading (FPSO) facility used to accept production from the fields be the first FPSO in the Gulf of Mexico, at 2,600 metres, it will also be the world’s deepest operating FPSO. David Lawes, Director of Product Development, reports for Baseline.

The Cascade and Chinook fields lie 180 miles offshore in the ultra-deep water of the Walker Ridge block. Petrobras America Inc. (PAI), the fields’ operator, has chosen to fast track the development with the installation of an FPSO that is scheduled to be installed and in production in 2010.

Free Standing Hybrid Risers (FSHRs) connected to flowlines from each field will serve the FPSO, delivering oil and gas to the surface for processing and exporting processed gas to a subsea pipeline. Crude will be offloaded to a shuttle tanker. All risers and umbilicals are to be integrated into a disconnectable submerged turret buoy that will allow the FPSO to move off-station when there is an impending threat to the facility.

Life-of-field monitoring
To maintain the integrity of the FSHRs, the Subsea Technology Group from Petrobras’s R&D Centre in Brazil, prepared a specification for PAI of a comprehensive life-of-field monitoring system and contracted BMT Scientific Marine Services as the prime systems integrator responsible for its delivery. BMT has many years’ experience in the development of offshore monitoring systems and, following the successful development of a similar system for the Petrobras P-52 platform in Brazil in 2007 (see opposite), has once again chosen to partner with Sonardyne for the integrated acoustic positioning and telemetry component of the system.

The primary requirement for the acoustic instrumentation is to monitor the position of each riser tower and of the turret buoy relative to the seabed. In addition, integrated sensors will monitor depth, temperature, inclination and sound speed whilst the integrated modem will telemeter data from BMT’s load and attitude monitoring system on each riser tower to the turret buoy. The system uses Sonardyne Wideband® signal architecture to guarantee high speed and reliable data communications for all these tasks.

Measure, command, log data
To ensure line-of-sight to each riser tower without obstruction by the flexible risers or mooring lines, the turret buoy will be equipped with three transceivers. The transceivers perform the following multiple functions:

- They measure ranges directly from themselves to the seabed transponder array in order to provide an accurate position for the turret buoy.
- They send commands to transponders mounted near the top of each riser tower, instructing them to measure the ranges to the seabed array. The positions of the riser tops can then be accurately determined.
- They acquire sensor data from the riser-top transponders and the seabed array.
- They send commands to, and recover data from BMT’s data logger on the riser top, fitted with an acoustic modem.

The transponder on the riser tops and on the seabed are versions of Sonardyne’s new Autonomous Monitoring Transponders which operate an efficient Wideband command set.

This allows much faster set up of transponder parameters and enables the sensors fitted to the riser-top transponders to be measured and reported at the same time as the acoustic measurements are made, greatly speeding up the acoustic monitoring cycle.

Normally, data acquisition will be controlled by BMT’s monitoring system on the FPSO. However, in the event of a disconnection, the system continues to record data on the turret buoy, which can later be downloaded by the FPSO or another vessel for processing by Petrobras proprietary software. The integrity monitoring system will provide valuable data about the movement and loading on hybrid riser systems during extreme weather events.

The system demonstrates a growing demand for reliable subsea remote integrity monitoring that has been enabled by the high performance of both Sonardyne’s Wideband® acoustic positioning and data communication systems and BMT’s proven subsea strain and motion sensing systems. BL
Sonardyne last partnered with BMT in 2007 when the two companies worked to supply the acoustic positioning and data recovery equipment for the single Free Standing Hybrid Riser (FSHR) close to the Petrobras P-52 platform in the Brazilian Roncador field. Installed in the Autumn of that year, a single acoustic transceiver on the platform communicates with the transponders and modem on the riser top and with a seabed array of five Sonardyne Compatt 5 transponders. The monitoring system sends strain, motion and position information every four hours. Because of the large amount of data to recover from the data logger on the riser top – over 90 Mbytes in the first six months alone – Sonardyne’s High Data Rate Link (HDRL) is employed to transfer data from the logger to the platform.

Since its commissioning in 2007, the system has provided invaluable data for analysing the movement of the riser tower, allowing confidence in the development of more complex FSHR installations such as in the upcoming Cascade and Chinook field.
BOS choose SIPS 2 and Lodestar AHRS for the *Arctic*

With the capacity to tow six, eight kilometre long streamers, the *BOS Arctic* is one of the latest vessels to join the growing fleet of 2D, 3D and 4D vessels owned and operated by Bergen Oilfield Services (BOS).

During its recent conversion in Spain, BOS equipped the *Arctic* with a Sonardyne SIPS 2 system to provide continuous, real-time acoustic positioning for the vessel’s survey spread. Significantly, the *Arctic* is also now the first seismic vessel in service to be equipped with a Sonardyne Lodestar Attitude and Heading Reference System. This was chosen to provide high accuracy heading, heave, pitch and roll measurement for a variety of onboard applications including motion compensation for a multi-beam echo-sounder, as an IMO certified master heading device (See page 04), helideck monitoring and an input for the vessel’s main navigation suite.

SIPS 2 uses transceivers attached to each streamer, air gun and tailbuoy to measure acoustic ranges between each other and the survey vessel, enabling both the shape of the towed array to be known and the position of the hydrophones, relative to the vessel, to be precisely determined.

Modern seismic vessels towing long, wide arrays create a demanding operating environment for positioning systems. “The high levels of in-water noise generated by ships and their seismic sources, requires the application of digital signal techniques to ensure that the thousands of acoustic...”

The *BOS Arctic* has the capacity to tow six, eight kilometre long streamers.
signals being transmitted can be clearly detected,” explained Geophysical Business Manager, Trevor Barnes. “SIPS 2 meets these needs.

“By using a digitally encoded signal, many more ranges can be collected in a shot point than conventional analogue systems allowing up to 20 streamers to be positioned if desired,” said Trevor.

“Additionally, vessels operating with SIPS 2 have demonstrated their ability to maintain performance when weather conditions become marginal due to the robustness of the digital acoustic technology.”

Stuart Squires, Manager, Navigation Services at BOS spoke of his company’s decision to install Sonardyne. “SIPS has got a great track record; second to none. A factor that particularly appealed to us is that the system can be expanded to accommodate more streamers and offer full acoustic bracing down the entire length of the streamers if we need it. This gives us the flexibility to configure the Arctic to meet different market needs.”

The SIPS equipment supplied to BOS includes the latest generation ‘Carbon D’ transceivers which incorporate a carbon fibre housing to resist corrosion and D-sized cell batteries to provide long in-water operating life. This in turn reduces the need for battery changing whilst the streamers are deployed.

With one eye to the future, BOS decided to install a Sonardyne survey-grade, through-hull deployment machine during the refit. “We’re using it initially for the SIPS system but if we decide at a later stage to fit a USBL system for dynamic positioning and ROV survey work, it will be an easy upgrade as we won’t have to take the vessel out of service to fit it,” commented Stuart. “SIPS and Lodestar have integrated seamlessly with our operations and provide the Arctic with a unique capability,” he concluded.
Systems and Products

Compatt 5 Max

An ultra long-life acoustic positioning transponder enabling semi-permanent deployment for life-of-field operations. It provides high accuracy Wideband simultaneous operations for multi-vessel and subsea vehicle positioning.

Compatt 5 Max is designed to reduce the total deployment costs associated with vessel time installing reference transponders during both drilling and construction phases of large field developments.

Sonardyne’s Survey Support Group can help customers carefully plan locations for a sparse network of reference transponders around key sites such as drill centres and anchor sets, therefore optimising the number of transponders required. The ultra long battery life enables Compatt 5 Max transponders to be left in situ through out all drilling and construction activities therefore saving vessel installation time which reduces operational cost.

Compatt 5 Max is compatible with all aspects of drilling and construction activity by being compatible with Sonardyne’s LUSBL and DP position reference systems (including the new Marksman system) already installed on many drilling and construction vessels. The Wideband signals enable seamless multi-vessel ‘SIMOPS’ capability ensuring no vessel down time. They are also compatible with Sonardyne’s survey grade USBL and LBL systems, and other USBL systems such as Kongsberg HiPAP®. This allows them to be used as fixed DP and survey references during all survey tasks including metrology, structure deployments, cut-to-length and umbilical lay. The long battery life is provided by either lithium or alkaline battery packs giving up to eight years listening life and typically greater than two years when in constant use. Even longer battery life is available on request if required. Omni or directional transducers are available along with a range of integrated sensors.

Compatt 5 Max Facts & Figures

- Ultra long-life, semi-permanent transponder – reduces installation costs and vessel time
- 2+ years battery life when continuously transmitting
- Enables full SIMOPS Wideband multi-vessel operations
- Fully LUSBL, USBL and LBL compatible
- <50mm accuracy, <20mm precision
- High power, long range (>3km)
- Integral sensors available: sound velocity, high accuracy pressure, temperature and inclinometers
- Depth rated to 3,000 or 5,000 metres
Wideband Mini Transponder

A new mini-sized acoustic positioning transponder, the WMT is available for ROVs and other subsea vehicles offering full Sonardyne Wideband® interrogation and reply capability. Uses the same remote transducers as those available for WSMs.

Sonardyne’s existing Wideband Sub-Mini transponder (WSM) is typically interrogated by a responder trigger down an ROVs’ umbilical or a narrow band tone signal. In some situations, reverberation or multipath of the tone interrogation can cause interference problems. The new WMT is Sonardyne’s first mini-sized transponder, slightly larger than the WSM and providing full two-way Wideband interrogation and reply which completely mitigates interference from other users and to other users.

For use on ROVs, the WMT includes a responder trigger, an integrated Li-Ion battery pack that is charged from the ROV’s power supply and full RS232 communications enabling channel set up, power, gain etc. to be changed from the surface. Digital output lines enable emergency acoustic commanding of ROV functions in the event of ROV umbilical failure, for example, clump weight release. An On/Off switch helps ensure the battery back is not discharged when not in use. When an umbilical trigger is not available, then half of the full Wideband mode provides excellent USBL performance in a small, lightweight form.

New remote transducers, either omni or directional are available for both the WMT and existing WSM range. These make installation on an ROV easier as the transducer can installed where there is good line-of-sight.

The main body of the transponder, the more expensive part, can then be installed within the ROV frame where it is well protected. Transducers can then be easily replaced if damaged.

Wideband Mini Transponder

- Full two-way Sonardyne Wideband® interrogation and reply – mitigates any interference and multi-path issues
- Mini size – lightweight and small
- Responder mode
- Li-Ion battery pack
- Optional remote transducer
- Pressure and temperature sensors options
- Full RS232 control from the surface
- On/Off switch
- New, versatile and future-proof design
Sonardyne Asia has had the most dynamic year since its inception in terms of both support and sales. Our staff numbers have increased to match the growth that has been seen in all sectors especially in our core oil and gas markets.

With more staff, services will continue to improve with faster equipment turnarounds, more offshore engineers and a higher frequency of training courses.

The Singapore office quickly responded to the implementation of the Singapore Strategic Goods Control System which took effect in 2008. We became one of the first companies to achieve Tier 3 accreditation which ensured that deliveries to customers were not delayed.

Once again the highlight of the social scene during the OSEA exhibition was the Sonardyne Football Night, with everyone having a fun evening.

As mentioned on page 07, Sonardyne Asia is continuing to invest in the region by moving into new premises to allow greater support for clients both new and old. It will be a pleasure to welcome you to our new office during 2009.

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**SE Asia – Singapore**

**John Ramsden**  
Senior Vice President

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**USA – Houston**

**Richard Binks**  
Sales Director

Sonardyne Inc has just moved into new, large premises. With twice the floorspace, there now exists the option of manufacturing some products directly in the USA. After 10 years with the company, Spencer Collins has been promoted to the role of Senior Vice President, International Strategic Sales. To further strengthen and promote our growth in the USA, a new General Manager North America will be recruited along with additional resources to the business development team. We look forward to making further announcements in due course.

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**UK – Aberdeen**

**Barry Cairns**  
Sales Manager

In 2008 we had outstanding success with the introduction of customer workshops. Headed by our survey group, these were developed to bring clients into Sonardyne and give them the opportunity to ask us anything. The dialogue has allowed us to get closer to the industry and increase our understanding of our regional markets.

**Customer Seminars**

Product awareness events have also been a focus such as the evening of short seminars on the back of indoor golf. These seminars were also used as an opportunity to bring our engineering teams into the client forum to help them understand the needs of the industry. More open workshops and seminars are planned for 2009 along with individual customer training in our newly refurbished facilities.

To further strengthen the team, I am pleased to announce two new additions. Head up our workshop is Neil Taylor who joins us from the Royal Navy where he served for 22 years. Joining Neil is technician Colin Sutherland who has an HND in Mechatronics and is at present completing his modern day apprenticeship.

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**Brazil – Macaé**

**Gavin Hunting**  
Regional Manager

Offshore activity in Brazil remains busy and as such we are continuing to expand our business and infrastructure to improve support for existing and new customers.

David Wright, formerly with Kongsberg, is our new Sales and Applications Support Manager. David has many years of experience within the offshore survey industry and will add great value to our operation.

Joining the field engineering team is André Moura.

**Survey and Construction**

CBO has just taken delivery of a Fusion USBL for their new RSV, the CBO Isabella. The system is connected to two digital USBL transceivers, each on an independent deployment machine. ROV and survey services will be provided by DeepOcean.

**Drilling**

The Peregrine-I, now operated by Esesco, has taken delivery of a Wideband backup BOP control system whilst Noble’s DP drillship Muravenko is also upgrading its acoustic BOP backup control to our latest Wideband technology. The system will be commissioned early in 2009.
Help & Advice

Your questions answered

Ask Darren

Darren Taylor and Darren Murphy are the front line of Sonardyne’s customer support team. If you have a question, they can get you the answer.

If there’s something you’ve always been meaning to ask Sonardyne, then we’re here to get you the answer. Contact support@sonardyne.com with all your technical questions for a fast response from the two Darren.

Q

We are planning for a major project in a busy deep water field involving numerous vessels and contractors. Our acoustic plans in the past have been designed around toneburst only systems but we now have a mix of tone and Wideband systems, as well as equipment suppliers. I’ve heard that whilst Wideband will work in and around existing tone systems with no problems, the tone systems can pick up Wideband signals which can cause issues. Obviously we want to minimise downtime. Can Sonardyne assist with planning for simultaneous tone and Wideband systems using your equipment and that of other suppliers?

A

(DT) Yes you can use tone and Sonardyne’s Wideband® systems together. However the frequency band used by Wideband signals is the same Medium Frequency (MF) band used for tone based USBL and LBL equipment, so you will need to plan ahead.

Modern digital transceivers can detect the difference between tone and Wideband signals allowing both signals to be used together. Analogue transceivers do not know the difference between Wideband and tone so they can falsely detect Wideband signals as though they are tone signals. In a USBL operation for example, this false detection could result in a sudden jump in position.

Digital transceivers such as our 8021/8023 USBL transceivers, Inverted USBL, RovNav 6 LBL transceivers and also Kongsvig’s HiPAP®, can detect the difference between Wideband and tone signals.

(DM) If Wideband signals are to be used in the vicinity of any legacy Sonardyne transceivers, take a look at our user guide to frequency planning using Sonardyne Wideband®. Available to download at www.sonardyne.com/Support/Z_cards/index.html, it is designed to assist users of Sonardyne acoustic positioning systems when planning or undertaking USBL and LBL subsea operations in the presence of both Wideband and legacy tone systems. If you contact our Survey Support Group at survey.support@sonardyne.com they will be happy to discuss your project.

Q

In a few weeks I’m joining a survey vessel off the coast of South Africa that is using a Scout-Plus system. I have been told that the previous crew has lost the user manual. Is it possible to get a replacement?

A

(DT) Yes of course. Go to our website and follow this link www.sonardyne.com/Support/Manuals/index.html which has a list of all our available manuals. Fill out the online request and submit your details, then the manual can be emailed directly to you, normally within one working day of the request.

(DM) If you prefer, we can send you a CD of the manual anywhere in the world.

Q

We received a consignment of SIPS 2 Carbon D XSRS transceivers with alkaline battery stacks fitted as standard. Can we replace the alkaline batteries with lithium batteries? How much extra life will we get?

A

(DT) The XSRS units you have can use alkaline or lithium battery stacks, auto detecting whichever is fitted. You should expect the 8086 XSRS and 8088 ASV transceivers to have a typical battery life of 14–16 weeks with alkaline batteries while lithium batteries typically last 42–48 weeks. Remember, the number of interrogations will directly affect the battery’s life.

(DM) When the battery stack is removed, the software will reset the battery count. It does not keep a record of the stack’s working life. You should expect the 8086 XSRS and 8088 ASV transceivers to have a typical battery life of 14–16 weeks with alkaline batteries while lithium batteries typically last 42–48 weeks. Remember, the number of interrogations will directly affect the battery’s life.

(DM) When the battery stack is removed, the software will reset the battery count. It does not keep a record of the stack’s working life. When the batteries in the stacks reach the end of their working lives, remove and safely dispose of the batteries in accordance with your company procedure and local regulations. Never mix old batteries with new batteries and don’t use alkaline and lithium battery stacks together.
We think of it as a scatter-plot.

With many offshore fields being developed in waters exceeding 1,500 metres, dynamically positioned vessels need accurate and repeatable subsea position referencing. Marksman from Sonardyne hits the target every time. At the heart of Marksman is Sonardyne’s Wideband® technology enabling robust, subsea positioning in all water depths, precise ranging accuracy and faster, more efficient vessel operations. Combined with intuitive, easy-to-use software and a new generation of vessel data processors, Marksman extends the reach of your drilling and production capabilities. What are you setting your sights on?

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