

SHEARWATER[®]

Clearly Better.

Revealing possibilities
shearwatergeo.com



Marine Acquisition





Marine Acquisition

A powerful fleet, complete with modern technology, manned by experienced crews with advanced Fast Track processing capacity.

Work safely and efficiently, in all operating conditions
- delivering a cost-effective, high-quality service.



Marine Acquisition

The combination of a modern fleet, advanced technologies and experienced crews makes Shearwater the reliable choice for marine acquisition.



Safety

Hands-on risk management and our strong safety culture guarantees high performance acquisition even in the most challenging conditions.

Capability

We have a strong track record of working safely, efficiently, and responsibly in the most challenging exploration provinces around the globe.

Flexibility

Modern vessels, combined with experienced staff enable us to provide flexible high volume surveys all from the same acquisition platform.

Technologies

The world's most advanced marine seismic acquisition technologies for exploration, reservoir delineation, characterization, and monitoring.

Techniques

Shearwater offers the widest range of acquisition techniques to provide the level of subsurface illumination and image fidelity you need to make informed decisions about your reservoir.

The Fleet

Shearwater owns the industry's leading fleet of eleven powerful high capacity seismic vessels, 3 multipurpose vessels (combined ocean bottom, towed streamer, source vessels), and dedicated source vessels.

QHSE

Without compromise, we will continue to allocate both human and material resources to ensure our QHSE culture and performance meet your expectations.

Our Industry has always placed an overriding importance on Health and Safety. At Shearwater we acknowledge the duty of care that we hold for the Health and Safety of our employees and contractors.

We demand safe behavior from all of our stakeholders and encourage it as both a personal and a professional value.

focus places safety at the forefront of the company's ethos and is a priority factor in every employee's daily routine as well as company appraisal criteria. Shearwater's management systems are aligned to IOGP guidelines, certified to ISO9001 and compliant with ISO14001 and OHSAS18001 standards.

We have implemented best-in-class Integrated Management System software to actively facilitate and transparently communicate QHSE compliance.

Marine seismic acquisition projects can be exposed to unique and variable hazards depending on where in the world prospects are located. Shearwater promotes the use of proactive, leading

indicators. These have been specifically configured to provide our employees with the tools required to identify and manage potential hazards. They also reflect the level of QHSE effort from the workforce. Calculation and publication of such indicators can be used, for example, to actively monitor trends in the safety culture of each crew over the duration of a project, or between two vessels.

Continually improving upon the performance of these indicators drives our ongoing effort towards our goal of zero loss, zero harm and zero rework. Shearwater's Employees and Assets are well proven. We are ideally placed to understand your concerns, meet your expectations and to deliver safe, efficient projects.

Shearwater is a Governing Member of IAGC.

For more information on Shearwater's commitment to employee development and QHSE visit:
shearwatergeo.com





Efficiency with Shearwater

Our integrated approach ensures maximum benefits for our clients and allows a carefully tailored service to precisely match the needs of each project.

Power and redundancy separate Shearwater's vessels from the majority of the world's seismic fleet. We can consistently and safely tow large and wide streamer spreads in harsh frontier environments. It also allows us to operate confidently in obstructed areas, high current environments and in shallow water.

Working together, our acquisition and processing teams provide you with the highest quality seismic data and Fast Track deliverables for every type of survey and for all acquisition techniques.

Our assets, experienced crews, and maritime managers have a strong track record of working safely, efficiently and responsibly in the most challenging exploration provinces around the globe.

Shearwater is fully ISO9001:2008 certified, with offshore operations managed under the ISO14001 environmental standard through our maritime technical managers GC Rieber Shipping.

We Deliver

Global Operational Experience

Modern, proven vessels with experienced crews

Powerful and Reliable Platforms

Capable of operating safely and efficiently in all environments

Uniform yet Flexible Spreads and Technology

Including, **Isometrix**, OBS, **Flexisource**, **SHarpbb**, and **SHarpsig**

Powered by Reveal

RTQC, Onboard Processing and Fast Track service



Power and Redundancy

The Shearwater fleet has both the power and redundancy to operate in the most challenging environments. They separate themselves from the worldwide seismic fleet with their high transit speed, enabling us to travel efficiently to wherever our clients require us to be.

These purpose built vessels are ready to achieve the highest standard of acquisition projects regardless of complexity, area or environmental conditions.



Safety

Safety, for Shearwater, is about hands-on risk management, continual improvement and a strong culture shared by all employees. Safe behavior is expected of every employee, with very clear line management accountability.



Flexibility

Flexibility at Shearwater comes not just from great vessels, equipment and expertise, but also from our attitude and willingness to adapt in order to achieve and exceed our client's needs.

Our standard equipment inventories and configurations allow the acquisition of a large range of innovative acquisition techniques, providing high-quality broadband data designed to meet our client's geophysical objectives.



The Fleet

Shearwater owns the industry's leading fleet of eleven powerful high capacity seismic vessels, 3 multipurpose vessels (combined ocean bottom, towed streamer, source vessels), and dedicated source vessels.

This gives us the flexibility to accommodate the demands of exploration and development projects, from large-scale regional 3D surveys to focused 4D production monitoring. Combining some of the world's most innovative and efficient vessels with the most advanced acquisition systems, provides the ability to deploy the optimal acquisition configuration to meet the requirements of every survey design and technique. This ensures exceptional results in even the toughest environments.

The three multipurpose and two source vessels are equipped to acquire surveys combining towed streamer with ocean bottom systems. In addition the source vessels can be used for under-shooting, rich-azimuth surveys and VSP projects.

High Capacity 3D Streamer Vessels

Shearwater's fleet of purpose built seismic vessels designed for safe and efficient seismic acquisition using towed streamers, ocean bottom nodes (OBN) and ocean bottom cables (OBC). Combined with our onboard and onshore data processing expertise we deliver industry leading quality products.



Amazon Warrior



Amazon Conqueror



Polar Empress



Polar Duke



Polar Duchess



Polar Marquis



SW Amundsen



SW Magellan



SW Columbus



SW Eagle



Trident

Multipurpose Vessels



SW Vespucci



SW Cook



SW Tasman

Source Vessels



SW Diamond



SW Emerald



Polar Empress & Amazon Conqueror



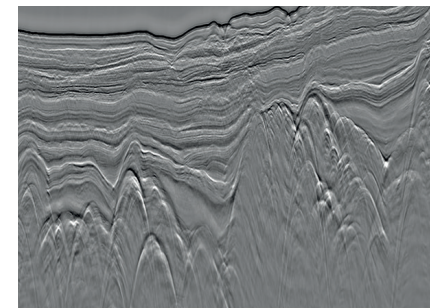
Technologies

The world's most advanced marine seismic acquisition technologies for exploration, reservoir delineation, characterization, and monitoring.

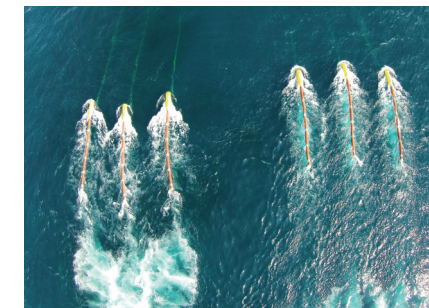
Shearwater's range of leading streamer technologies is the result of extensive research and engineering over many decades. Providing the best data quality and operational performance in the industry, the *Q_{marine}* and *Iso_{metrix}* systems have set new standards in seismic acquisition.

Ocean bottom seismic (OBS) acquisition, with either nodal technology or the established *Q_{seabed}* system, delivers the highest-quality multicomponent data in the most efficient and cost-effective manner possible.

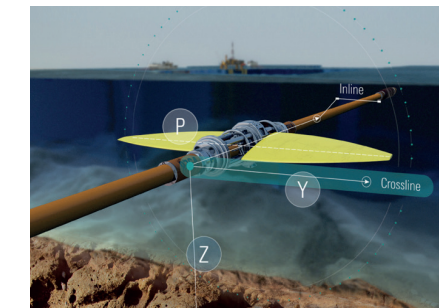
Our eSource bandwidth-controlled seismic source technology preserves the low-frequency energy required for seismic exploration, while suppressing unwanted high-frequency energy.



SHarp_{bb} Offshore



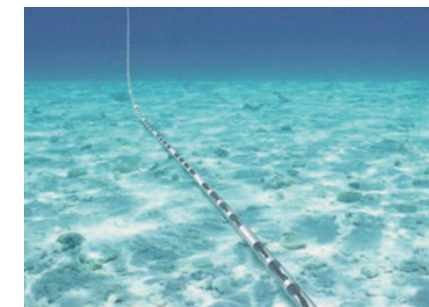
Flexi_{source}



Iso_{metrix} Multimeasurement Streamer System



Q_{marine} Point-Receiver Marine Seismic System



Seabed Seismic Technologies

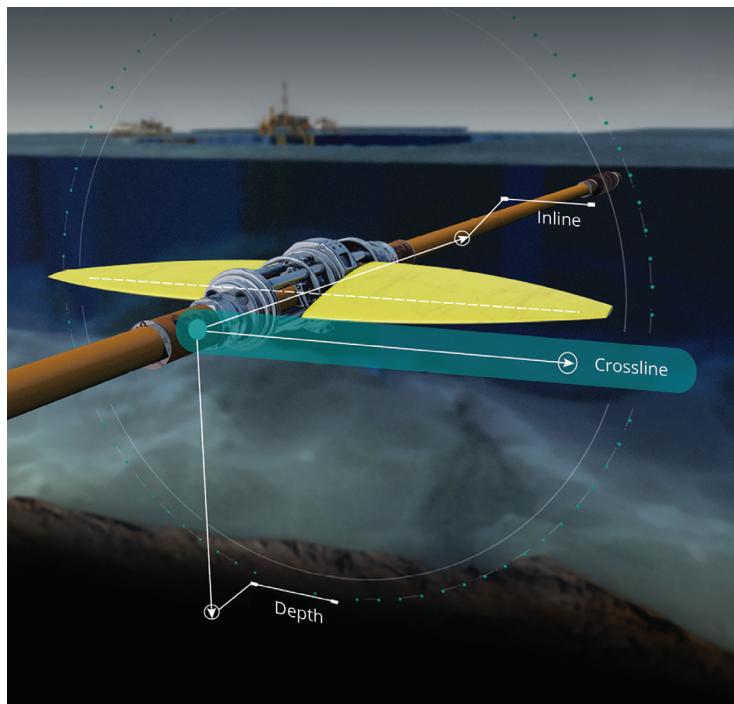


eSource Bandwidth-Controlled Seismic Source



Isometrix

Building on the proven technology of the *Qmarine* system, our unique **Isometrix** technology acquires broadband data in all three dimensions.



At the heart of **Isometrix** technology is a revolutionary seismic streamer. This combines standard hydrophone (P) measurements with two accelerometer sensors recording the seismic pressure gradient in the vertical (Z) and cross cable (Y) directions. Dual-sensor measurements (PZ) enable receiver deghosting, providing deeper insight into the Earth's complexity. Combining the three PZY measurements enables true 3D deghosting and reconstruction of the seismic wavefield between the streamers.

Isometrically sampled multimeasurement data improves the definition of geological features in the subsurface from shallow to deep, delivering clear performance uplifts in comparison with conventional 3D surveys. The fine spatial sampling achieved by **Isometrix** technology enables wider streamer separation, single-vessel wide-tow source, and multivessel acquisition geometries, which can increase subsurface coverage by more than 100% without compromising data. The result is efficient exploration, completed in less time, and reducing operational and environmental exposure.

Flexisource

Using the same equipment, multiple source arrays, continuous recording and advanced deblending techniques provide quality data and faster acquisition at a lower exploration cost.

The Shearwater **Flexisource** is a combination of multiple, overlapping sources, continuous recording and advanced deblending techniques to separate the data into individual, non-overlapping shot records. **Flexisource** can be deployed with three or more source arrays providing opportunities for higher quality data or lower cost and faster acquisition.

The continuous recording and deblending used in **Flexisource** provide a renaissance in multiple source acquisition. You no longer have to wait for one record to finish before activating the next source - the shot records can be allowed to overlap.

The overlap, with deblending, means you no longer sacrifice fold for efficiency. One way to think of this is as an increase in source effort.

This extra effort gives a dividend that can be used to improve crossline sampling, or to improve efficiency, or both.

The Shearwater standard **Flexisource** acquisition configuration deploys 6 gun strings arranged as 3 two string source arrays.

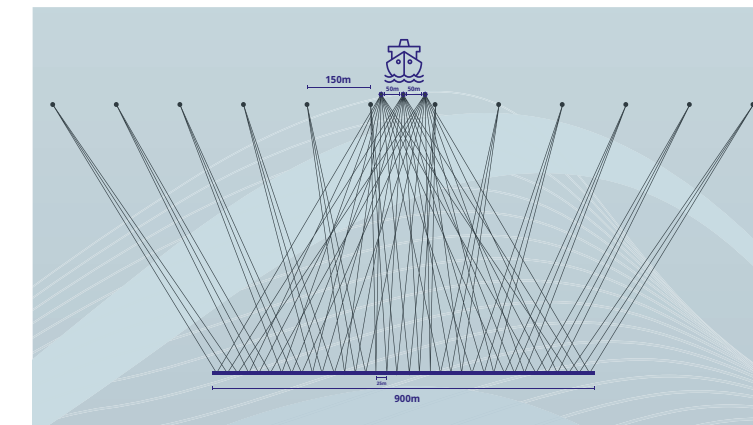
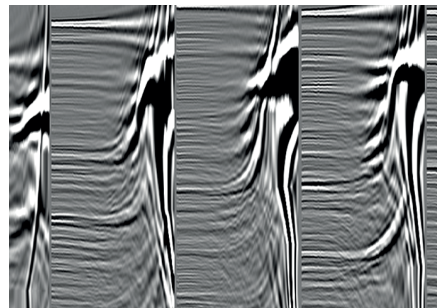


Diagram above shows the **Flexisource** coverage and crossline spacing 12 x 150 x 3 sources, Crossline spacing 25m.

Techniques

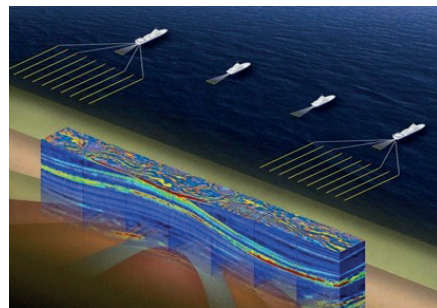


Survey Evaluation & Design

Project Planning

Fast Track Processing

Onboard Quality Control Services



Innovative techniques for a custom marine acquisition solution.

Regardless of the complexity and requirements of your marine seismic challenge, Shearwater offers the widest range of acquisition techniques, including broadband, Coil, FAZ, WAZ, Seabed (node and cable), to provide the level of subsurface illumination and image fidelity you need to make informed decisions about your reservoir.

Offshore Performance

Wide-Azimuth Marine Acquisition

Coil Shooting, FAZ Acquisition





Survey Planning

Our integrated approach ensures maximum benefits for our clients and allows a carefully tailored service to precisely match the needs of each project.

We engage with clients and all other relevant stakeholders during the project planning stages. This ensures the Shearwater surveys benefit from thorough planning and project risk assessment; from remote, harsh, deep water offshore environments, to shallow water surveys with complex interfaces, oilfield infrastructure and SIMOPS, local fishing communities, and sensitive marine life considerations.

Detailed planning performed by our experienced personnel onshore and offshore identifies project specific risks. Appropriate controls are implemented to manage risk down to the lowest possible level.

Shearwater also employ dedicated geophysical staff to support our client's needs in order to identify the best acquisition techniques and parameters to meet their geophysical objectives and provide the best quality dataset within their budget.

Onboard Processing

Agile, responsive teams of industry-qualified experts, available when, where and for however long you need them. Get high-quality data rapidly, reduce costs and build in flexibility at the heart of your project.

Our interactive software, Shearwater Reveal, together with our expert offshore and onshore processing teams provide you with the highest quality 2D and 3D imaging of seismic data from all geological environments.

The same processing software is used both on our vessels and in our offices. This allows our teams the flexibility to process your data using the same interface for fully interactive testing and batch processing from Real Time QC through to model building and depth imaging.

Integrated and experienced acquisition and processing teams consistently provide you with the highest quality seismic data and Fast Track deliverables for every type of survey and for every type of acquisition technique. This allows us to produce a wide range of Fast Track products, from Post-Stack Migrations to full 3DSRME PSTM/PSDM sequences.

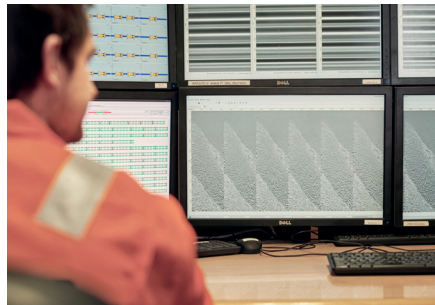
Quality Control

The Shearwater Reveal processing software provides the tools for Real Time QC, onboard time imaging and the estimation of the far field signature using near field hydrophone data that then allows for directional designature, Shearwater **SHarp**sig technology.

Onboard QC provides Real Time analysis of the recorded data quality thus allowing issues to be flagged and addressed promptly, enabling optimal decisions on costly standby. This ensures a high-quality data set is acquired with maximum efficiency.

We provide both Real Time Quality Control (RTQC) and Offline Quality Control (Offline QC).

Contact the Marine team to discuss your requirements:
sales@shearwatergeo.com



RTQC

Displays are monitored by highly trained staff which, combined with our advanced techniques, means that even minor data quality issues are picked up quickly.

- Integrated geophysicist teams
- Shot-by-shot far field estimation from near field hydrophones
- Seismic Interference monitoring
- Swell Noise removal in real time
- Fully customisable displays
- Goal Zero approach to QC errors



Offline QC

Offline QC products provide a comprehensive view of the data for our experienced Geophysicists to ensure all details of the data have been recorded and addressed fully.

- Experienced processing geophysicists
- Ready immediately at the end of each line
- Specialist QC products available
- Efficient and detailed QC and analysis using Shearwater Reveal processing software
- Selected QC data synchronised and plotted via web based portal
- Start up checks for each survey



Fast Track

Onboard and onshore Processing & Imaging teams work closely together to ensure we deliver the same quality on our vessels as in our offices.

- Dedicated supervision
- Receiver deghosting
- Linear and swell noise removal
- Seismic Interference removal
- Advanced demultiple including 3D-SRME
- Source deghosting, designation and debubble derived from the near field hydrophones

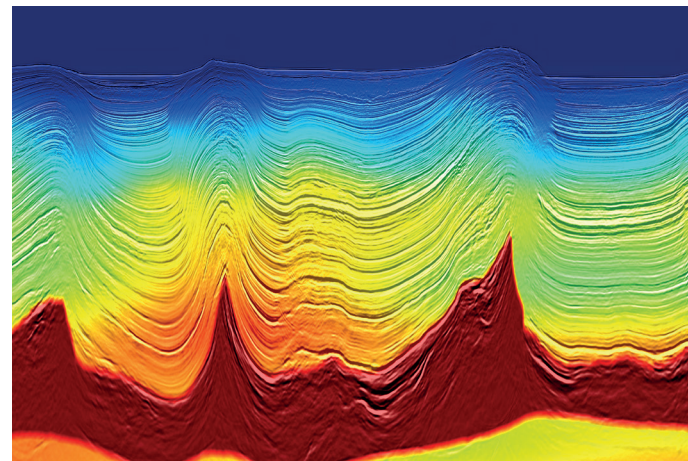
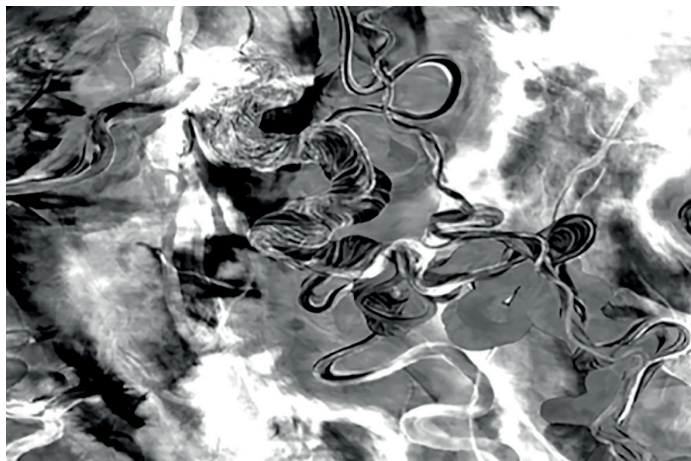


The Shearwater business lines work together to produce the highest quality result for your survey.



Clearly Better.

Our modern fleet, expert imaging teams and innovative software combine to offer exceptional results. Fast, flexible and cost-effective, Shearwater is the cutting edge geophysical services company.



Marine Acquisition

A powerful fleet, complete with modern technology, manned by experienced crews with advanced Fast Track processing capacity. Work safely and efficiently, in all operating conditions - delivering a cost-effective, high-quality service.



Processing & Imaging

Agile, responsive teams of experts, available when, where and for however long you need them. Get high-quality data rapidly, reduce costs and build in flexibility at the heart of your project.



Reveal Software

A modern, powerful and intuitive solution for demanding seismic data analysis, Reveal is a full processing software that can scale to run from a laptop in the field through to the largest data center.



Multi-Client

Our full service Multi-Client business offers refreshing flexibility and clarity. Reduce financial exposure and maximize your exploration returns.

SHEARWATER®



shearwatergeo.com