

GEOCHIRP 3D



KONGSBERG



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3D HIGH RESOLUTION SUB-BOTTOM PROFILER

GeoChirp 3D provides three dimensional acoustical images of shallow sub-seabed structures and buried objects. It transfers the well established principles of conventional 3D reflection seismics, used in hydrocarbon exploration, to high resolution chirp sub-bottom profiler technology.

Technology

GeoChirp 3D uses chirp acoustic signals that penetrate the sub-seabed and are reflected at boundaries and objects characterised by acoustic impedance contrasts. The reflected signals are recorded with an hydrophone array in seismic industry standard data format. Data is processed using off the shelf software to image the three dimensional structure of the upper tenth of meters below the seabed in decimetre resolution.

Applications

Typical applications include marine archaeology (buried wrecks and structures), marine construction (pre-construction surveys, pre-piling buried object avoidance), military (MCM, UXO), marine geology and geophysics.

System Components

Combined acquisition array

All acoustic source, hydrophone receivers and positioning components are incorporated into a surface tow body. This rigid frame is deployed and towed from small vessels of opportunity. The acoustic source array consists of four GeoPulse Plus

transducers with a bandwidth of 1.5 - 13 kHz, arranged into a Maltese cross configuration. 60 hydrophones are arranged into an array with 6 elements along and 10 elements across track with 25 cm separation in either direction. RTK GPS positioning and heading antennas together with a motion reference unit (MRU) allow the determination geo-referenced source and receiver positions.

Integrated acquisition system

The data acquisition deck unit combines seismic and navigation data capture in one system. It is controlled by a GUI for survey planning and control data quality control and storage in SEGY format.

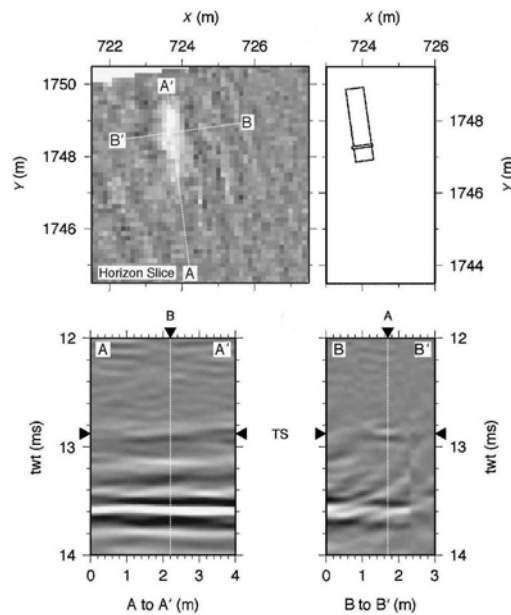
The source array is driven by the GeoPulse Plus transceiver. 60 receiver channels are captured and digitized using bespoke wide bandwidth acquisition electronics. The seismic data is combined with navigation data in the server, which runs the GUI and QA software.

Software

Third party 3D seismic processing and visualisation software can be offered as part of this complete survey package.

FEATURES

- High Resolution 3D seismics
- SEG Y data output
- RTK GPS positioning
- Motion Referencing
- GeoPulse Plus Sub-Bottom Profiler
- 60 channel hydrophone array
- Tens of meters sub-sea penetration
- Decimetre resolution



TECHNICAL SPECIFICATIONS

Combined acquisition array

- Tow speed: 1-6 knots
- Weight in air: 203 kg
- Dimensions: 4.35 m x 3.1 m x 1.95 m GPS antennas protrude
- Construction: Custom GRP sections, PVC and polyurethane foams and stainless steel

RTK GPS position and heading sensor

- Base station and Roving station including radio link
- Receiver type: GNSS L1/L2 RTK
- Signals received: GPS, Glonass, Galileo
- Horizontal accuracy: 10 mm + 1ppm (rms 67%)
- Heading accuracy: <math><0.09^\circ</math> at 1 m antenna separation

Motion Reference Unit MRU

- Roll, pitch accuracy dynamic: 0.03° rms
- Resolution angle: 0.001°
- Angle range roll, pitch: $\pm 30^\circ$

GeoPulse Plus source

- Transducers: 4 x T135 model
- Frequency range: 1.5 - 13 kHz, programmable signal

- Power output: 10 W to 4 kW user programmable
- Source level: up to 205 dB \pm 3dB re $1\mu\text{Pa}$ @ 1 m
- Penetration:
 - clay: up to 80 m
 - coarse sand: up to 6 m
- Resolution: up to 6 cm depending on signal

Hydrophone array

- Frequency range: 200 Hz - 25 kHz
- Sensitivity: up to 205 dB \pm 3dB re $1\text{V}/\mu\text{Pa}$
- Along track separation: 25 cm
- Across track separation: 25 cm

Integrated acquisition array

- Dimensions: 78 cm x 59 cm x 74 cm
- Weight: 77 kg
- Power: 220 VDC

Digital acquisition

- Number of channels: 60
- Sample rate: 250 kHz max
- Resolution: 24 bit
- Data format: SEG Y

Specifications subject to change without any further notice.