GEOACOUSTICS
DIGITAL SIDE SCAN SONAR

GENERAL DESCRIPTION

The GeoAcoustics Digital Side Scan Sonar (DSSS) is the highest dynamic range single beam dual frequency side scan commercially available. This highly advanced system allows precisely repeatable seabed feature mapping in a robust and reliable package. The system utilises high resolution direct digital sampling of the received signals, and full digital processing. This new technology offers unprecedented resolution and dynamic range (24 bit), simultaneous dual frequency operation (114/410 kHz), digital filters, pulse width auto adjust to optimise for any sample rate setting and a new high speed digital data link enabling very long lengths of low drag co-axial tow cable to be used. The system configuration, low power and small size make the DSSS ideally suited for installation onto a Remotely Operated Vehicle (ROV), or an Autonomous Underwater Vehicle (AUV) as well as combined profiler/magnetometer tow fish.

Deck Unit – GeoAcoustics Universal Transceiver

The GeoAcoustics Universal Transceiver contains power supplies and all connections and interfaces to power the tow fish down the tow cable; to facilitate bidirectional communication for control and status reporting: and to transfer data from the tow fish. The ultra high dynamic range means that no user controls are necessary to acquire raw digital data of the highest possible quality. Side scan images can be processed in real time from this raw data using the DSSS-Viewer software package provided with the system. The Deck Unit includes GPS interfaces and automatically synchronises the tow fish to GPS time using the 1PPS signal. This ensures accurate absolute time stamping for all data. The system also has real time triggering capability to allow the use of responders for accurate tow fish positioning relative to the vessel. The digital sonar data is also streamed out on Ethernet for use in real time by a digital acquisition system such as GeoPro-DSSS.

Subsea Electronics

The sub-sea electronics of the Digital Side Scan Sonar system can be mounted in a tow fish, on a combined tow fish or on an AUV or ROV. The use of standard sub-sea connectors and standard protocol interfaces allows easy installation in all situations. The sub sea electronics unit includes all sonar transmitter and receiver electronics as well as digital signal processing, attitude sensor, magnetometer interface, and tow cable data transmission. This ensures lossless sonar data transfer and highly repeatable sonar performance regardless of cable length.

The robust high speed (8 Mbits/sec) data transfer system, high raw data resolution (24 bits) and high output data rate (50 kHz) eliminates any bandwidth/ resolution trade-offs inherent in other digital sonar systems.

Standard System

The standard system employs a stainless steel tow fish and can operate to a depth of 1000 metres. The basic system includes the following:

- Deck Unit – GeoAcoustics Universal Transceiver complete with DSSS-Viewer software.
- Digital Side Scan Tow fish, which houses the Subsea Electronics and Two Dual Frequency Transducers (Port and Starboard).

Options include enhanced software and interfaces to additional hardware, tow cables and deck cables.

Features

- 1000 metre depth rating (standard).
- Simultaneous dual frequency operation.
- 24 bit dynamic range/resolution.
- Robust digital data transmission over long cables.
- Attitude sensor.
- High efficiency/low power for AUV/ROV.
- Low drag coaxial tow cable.
- Very high system bandwidth and resolution.

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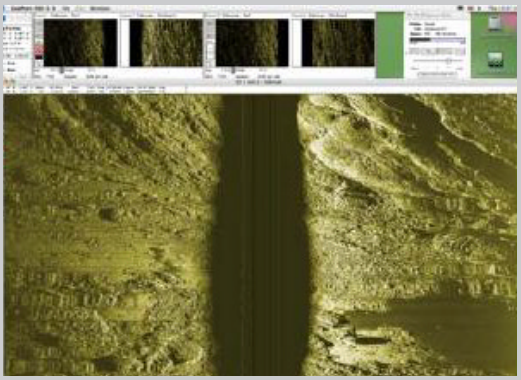
TECHNICAL SPECIFICATIONS



Deck Unit – GeoAcoustics Universal Transceiver

General

Power requirements:	110-230VAC selectable input, 50-60 Hz, 200W, optional 24VDC.
Size:	42.8cm W x 48.8cm D x 27.5cm H.
Weight:	26.5kg.
Temperature: Storage:	-20 to 75°C.
Operating:	-5 to 50°C.
Humidity:	10% to 95% RH, non-condensing.
Mounting:	The unit is suitable for either bench or rack mounting.

Operating Specification

Tow Fish Supply:	Isolated 370V DC, earth leakage & short circuit protected.

Digital Cable Link

Data Rate	
Uplink:	8 MBits/sec.
Downlink:	640 kBits/sec.
Cable length:	0-6000m.

Rear Panel Connectors

BNC:	Two each for responder/1PPS key.
RS232:	Six for GPS/time/ magnetometer etc.
Amphenol:	MS3102A-22-34S for deck cable.

Tow Fish

Tow speed:	1 to 12 knots.
Weight:	47kg in air plus optional ballast.
Dimension:	20cmH x 22.6cmW x 127cmL, 2 fins on tail protrude 22cm.
Frame:	Stainless Steel with shear release carry handle/tow point.
Nose:	Shock absorbing, abrasive resistant acetal with responder option.

Subsea Electronics Pressure Vessel

Transmitter Section

High frequency:	410 kHz ±1%.
Low frequency:	114 kHz ±1%.
Power output:	3 kW pulse ±20%.
Pulse length:	Programmable.
Pulse fall time:	3 cycles maximum.
Pulse repetition rate:	50 pulses per second max.
Protection:	Open and short circuit protected.
Efficiency:	Greater than 80%.

Receiver Section

Hi frequency:	410 kHz.
Low frequency:	114 kHz.
Bandwidth:	programmable up to 16 kHz.
Output resolution:	24 bits floating point.
Raw sample rate:	40 MHz.
Processing gain:	>30dB.
Output data rate:	up to 50 ksamples/sec per channel.

Timing

GPS 1PPS resolution:	20 us.
Responder:	100 us.

Attitude:

Heading accuracy:	±0.5 degree.
Heading resolution:	0.1 degree.
Roll/pitch accuracy:	±0.2 degree.
Roll/pitch resolution:	0.1 degree.
Depth accuracy:	1% full scale depth.
Depth resolution:	0.1 m.

General

Size:	12.2cm D x 55.2cm L.
Weight:	19.5kg in air 13.5kg in water.

Transducers

Source level:	223 ±3dB re 1iPa@ 1m.
Beamwidth:	114 kHz - 50° x 0.8°. 410 kHz - 40° x 0.3°.
Sensitivity:	-190dB re 1V/iPa.
Depression angle:	20° ±1° down.

Optional Sensor Interface

Output voltage:	24VDC.
Interface:	RS232.
Baud rate:	Up to 38.4 kbits/sec.

Options

- Deeper rated tow fish.
- 24VDC power input.
- Lightweight Kevlar Tow cable for shallow water use.
- Tow fish responder for acoustic tracking.
- RS232/422 sensor interface with 24VDC output.
- Magnetometer and Responder interfaces.
- Data Acquisition & Processing using DSSS-Viewer Plus, GeoPro-DSSS, SonarWiz or other 3rd Party package.
- GeoTexture – texture mapping and classification software.

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