

# GeoPulse Plus

## GeoAcoustics Universal Sub-Bottom Profiler



KONGSBERG

### Digital Chirp and Pinger Sub-Bottom Profiler with Versatile Mounting Options

#### Description

*GeoAcoustics GeoPulse Plus* is the latest and most technically advanced Sub-Bottom Profiling system on the market. Its digital processing and waveform selection technology enables the appropriate pulse-shape, power signature and configuration to be selected for the job in hand, whether it's mapping the geology in deep oceans or determining mud thickness in a silted harbour.

Traditional sub-bottom profilers utilise single frequency fixed length "pinger" type pulses, which reflect from subsea layers to map the morphology. With the advent of chirp technology and advances in digital processing techniques in the 1990s the science took a step forward with frequency modulated pulses - waveforms that encompass a range of frequencies.

The new GeoPulse Plus system combines the best features of both these technologies and adds higher transmit power combined with digitisation of the return signals at source. Massive over-sampling of the received signals provides high resolution 24 bit data.

#### System Components

GeoPulse Plus is the industry's only all-digital Sub-Bottom Profiler. The appropriate waveform for the intended application is stored in the subsea electronics memory and pre-selected from a drop down menu. New custom waveforms can also be added. The transmit transducers are located close to the electronics to minimise transmission loss and the return signal is detected either by these same transducers or by a trailing hydrophone, depending upon the system configuration. The received signal is routed to the Universal

Transceiver where the deconvoluted data can be output via Ethernet to any standard acquisition software package.

#### Universal Transceiver

The Universal Deck Unit is PC based with a monitor and keyboard/mouse to allow easy operation of system set up. Once up and running the system can be controlled using standard industry software.

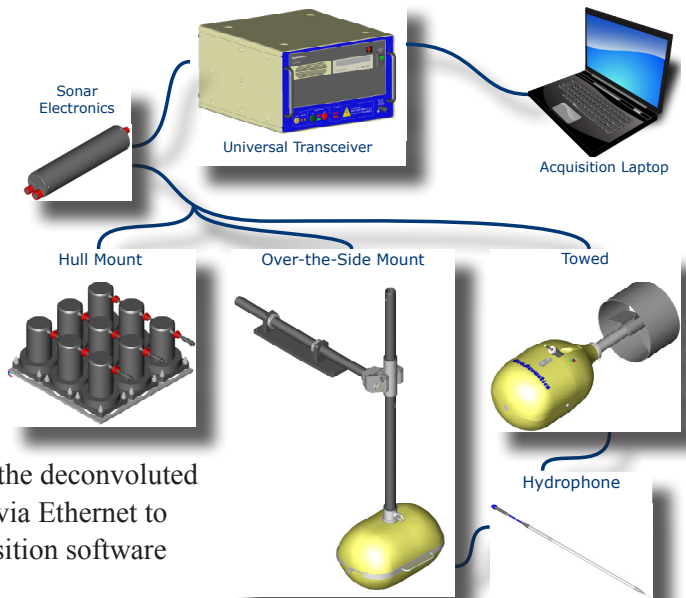
#### Subsea Electronics

The waterproof electronics module is manufactured in aluminium (stainless steel optional) and is rated to 2000 metres water depth. Its internal memory stores the required waveforms, and it utilises a super efficient HV transmitter to deliver high power to the transducers. The return signals received either from the trailing hydrophone or from the transducers are digitised prior to being routed to the Universal Transceiver via a local Ethernet connection or on longer cables via an ADSL link.

#### Transducers and Hydrophone

The T135 transducers are each rated to an output of 2.5 kW and operate efficiently over a wide frequency band of 1.5 - 13 kHz.

The trailing single channel hydrophone utilises 8 high-spec elements to capture the return signal and route it via an inline pre-amp



to the subsea electronics where it is digitised.

#### Transducer Deployment Options

##### Over-The-Side Mount

Ideal for small vessel operations the OTS version utilises an easy to deploy pole and associated universal mounting kit. The transducers are housed in a hydrodynamic pod.

##### Towed Transducer Vehicle

The Towfish is a proven design and is suitable for towing in deep or shallow waters. The rugged galvanised body and strong fibreglass shell provide added protection for the transducers and electronics housing while the receive hydrophone is trailed behind. Towfish deployment requires a steel armoured tow cable

##### Hull mounting

The transducers can be mounted in a sea chest either inside the ship's hull or in a purpose made gondola. The array is usually configured with a total of 4, 9 or 16 transducers. The larger arrays give a narrower beamwidth and are therefore more suitable to deep water applications.

### Deck Unit - Universal Transceiver

#### General

- Power requirements: 110-230VAC selectable input, 50-60 Hz, 200W
- Size: 42.8cm W x 49.7cm D x 27.5 cm H.
- Weight: 26.3 kg.
- 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.

#### PC Hardware

- Processor: 3GHz Intel® Core™ 2 Duo processor.
- Operating System: Windows® XP Professional (32bit)
- Hard drive: ≥320GB SATAII
- Memory: 4GB DDR2.
- Optical: Dual Layer DVD±RW.
- Graphics: NVIDIA® 8500GT 256MB

#### Connectors

- Video: DVI-D and D-Sub.
- USB, Ethernet, Audio and Parallel.
- BNC: PPS input
- 4 x RS232 ports
- Amphenol: MS3102A-22-34S for deck cable.
- BNC: external trigger (OTS, hull mounted)

#### Sub-Bottom Profiler

##### Transmit

- Frequency Range: 1.5 to 13 kHz programmable
- Power Output: 10 W to > 4 kW user programmable
- Source Level: up to 205dB ±3dB re 1uPa@1m
- Receiver sensitivity: -205dB ±3dB re 1V/uPa
- Programmable source signatures:

#### Features

- 1.5 - 13 kHz Sub-Bottom profiler
- 24 bit dynamic range, no AGC or TVG during acquisition
- 20 MHz raw data sampling, improved data quality
- Wide bandwidth robust digital data transmission
- Versatile hull mount, over-the-side mount and towed options

#### Performance

- Penetration (typical)
  - clay 80 m
  - coarse sand 6 m
- Resolution
  - 6 cm source sweep dependant

- pinger, variable number of cycles and frequency

- frequency modulated (chirp) variable envelope and frequency functions

- Pulse Repetition Rate: 4 pulses per second maximum for 32ms chirp sweep, 10 pulses per second for pinger waveforms
- Efficiency: Greater than 90%

#### Digital Cable Link

- Data Rate: 6-25 Mbits/s
- Cable length: 0-6000m

#### Subsea Electronics

- Dimensions: 545 mm L x 125 mm D
- Weight: 11 kg in air, 6 kg in water
- Depth rating: 2000 m (4000 m optional)

#### Transducer (Model T135)

- Dimensions: 184 mm x 184 mm x 267 mm H



- Weight: 11 kg in air, 6 kg in water

#### Towfish

- Tow speed: 1 to 12 knots.
- Weight: 125 kg
- Dimension: 156 cm (L) x 46 cm (W) x 46 cm (H),
- Transmit transducers 4 x T135

#### Over-the-side Mount Assembly

- Dimensions: 70 cm (L) x 52 cm (W) x 46 cm (H)  
Mounting Staff:  
One section 183 cm, two sections 360 cm
- Weight: 120 kg
- Transmit transducers 4 x T135

#### Hull mount

- 2 x 2 (4), 3 x 3 (9) and 4 x 4 (16) transducer arrays available
- Bespoke sea chest deployment
- Transmit transducers 4,9,16 x T135

GeoAcoustics Ltd is engaged in continuous development of its products, and reserves the right to alter the specifications without further notice

#### GeoAcoustics Limited

Shuttleworth Close  
Gapton Hall Industrial Estate  
Great Yarmouth NR31 0NQ  
United Kingdom

Telephone +44 1493 600666  
www.geoacoustics.com  
sales@geoacoustics.com

MG010411

**GeoAcoustics**  
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