



GeoSwath Plus

Wide swath bathymetry and georeferenced side scan



GeoSwath Plus

Wide Swath Bathymetry and co-registered
georeferenced side scan system

GeoAcoustics
A KONGSBERG COMPANY

We maximise marine performance by providing the Full Picture

Our mission

We shall earn the respect and recognition for our dedication to provide innovative and reliable marine electronics that ensure optimal operation at sea. By utilising and integrating our technology, experience and competencies in positioning, hydroacoustics, communication, control, navigation, simulation, and automation, we aim to give our customers The Full Picture. The Full Picture yields professional solutions and global services that make a difference enabling you to stay ahead of the competition.

Our philosophy

Our success depends on the success of our customers. Actively listening to our customers and truly understanding their needs, and then translating these needs into successful products and solutions is central to achieving our goal.

Our people are the key to our success and we empower them to achieve. Working together in a global network of knowledge, guided by our values, engenders innovation and world class performance. Every day we have to think a little differently, because every client is unique.

We aspire to translate the imagination and dedication of our staff into successful technologies and solutions. Our commitment is to add value to your operations by providing you with The Full Picture.

GeoSwath Plus Features

GeoSwath Plus is a Phase Measuring Bathymetric Sonar System. It simultaneously acquires swath bathymetry and side scan data. Its dual transducer configuration has a field of view of over 240°. The usable depth information is limited only by the strength of the signal scattered back from the seafloor, thus achieving a swath coverage of up to 12 times the water depth.

GeoSwath Plus is a productive survey tool for the shallow water environment.

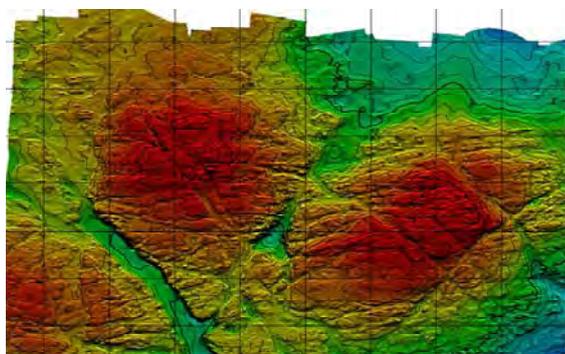
Three different frequency versions are available, 125, 250 and 500 kHz with depth performances of 200, 100 and 50 m respectively to match your survey requirements.

The system can be deployed on dedicated survey vessels as well as vessels of opportunity in versatile over-the-side, bow, moon pool or hull mount arrangements.

The standard system comprises the rugged sonar head and a dedicated deck unit including a PC running the GeoSwath Plus software package that offers all features from data acquisition to the production of the final bathymetry and side scan data products. Alternatively interfaces to all major hydrographic survey software suites are available.

GeoSwath Plus offers a turn-key solution for bathymetry and side scan surveying.

GeoSwath Plus versions for AUV and ROV deployment are available. The compact size, low power consumption, standard interfacing and depth rating of up to 4000 m makes it the ideal choice as a survey payload sensor.



Bathymetry data

High resolution bathymetry data showing rocky outcrops



Side Scan Data

The same area showing the co-registered side scan data

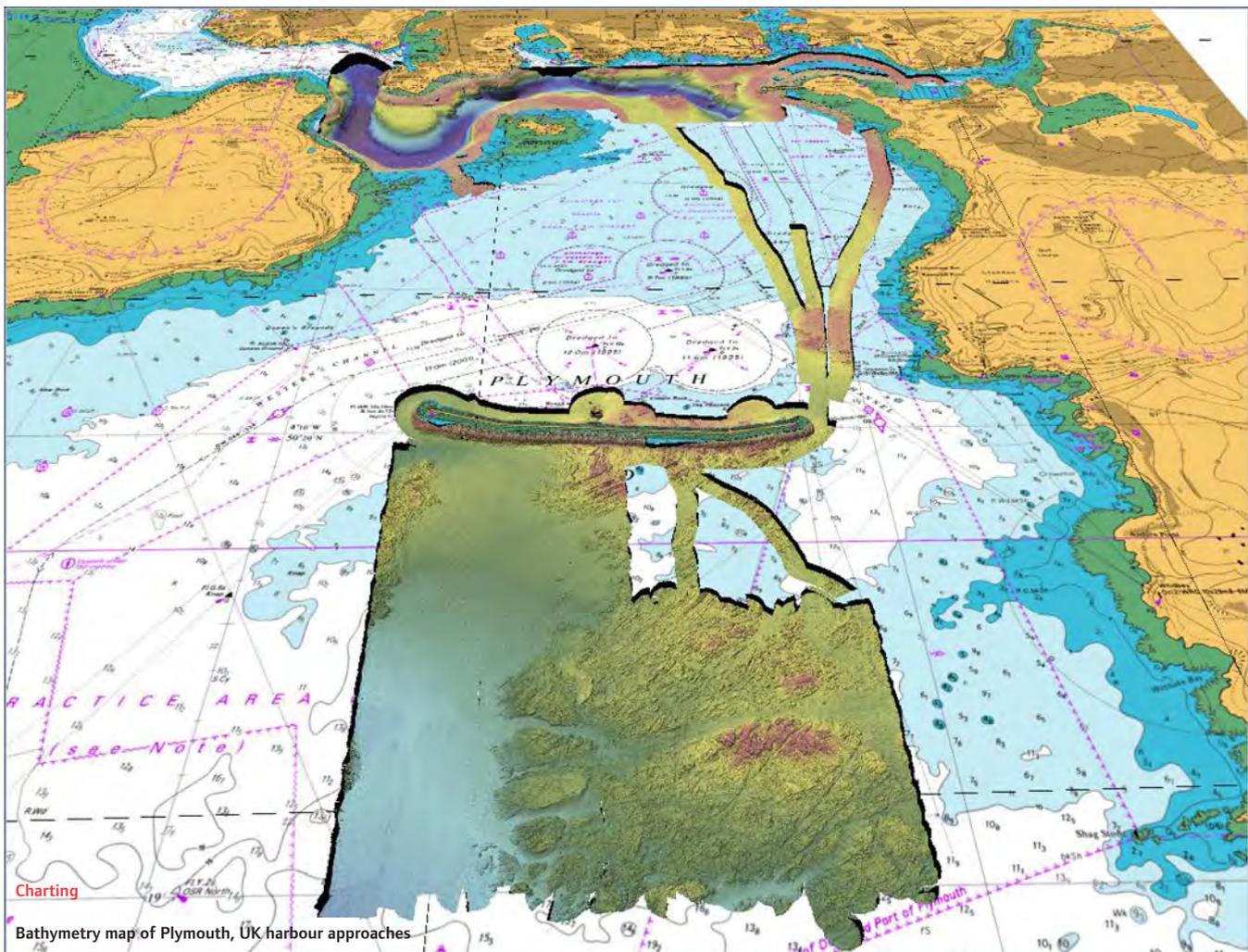
- Ultra high resolution swath bathymetry
- IHO SP-44, special order compliant
- Co-registered geo-referenced side scan
- Frequency versions: 125, 250, 500 kHz
- Up to 12 times water depth coverage
- 240° view angle
- Dual transducer set-up with versatile mounting options
- Full software solution included: data acquisition, calibration processing, presentation
- Interfaces to all customary peripheral sensors
- Interfaces to all customary software packages
- ROV and AUV versions with up to 4000 m depth rating

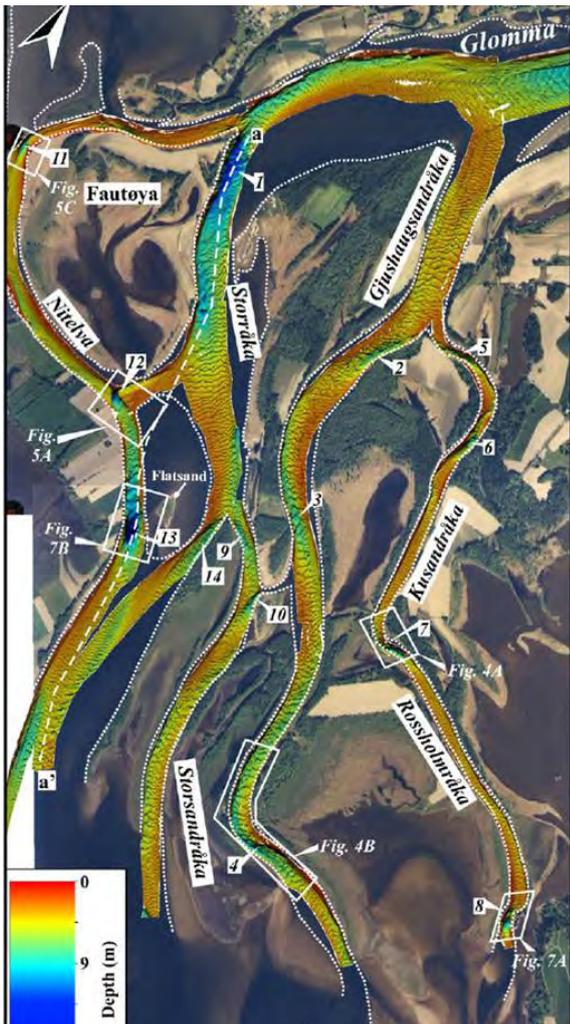
Applications

The wide swath coverage of up to 12 times the water depth and the co-registering of georeferenced side scan data make GeoSwath Plus the ideal tool for the shallow water survey environment. From hydrography and charting to dredging and inspection surveys to environmental assessment and habitat mapping the system is a proven and trusted solution within the global customer base.

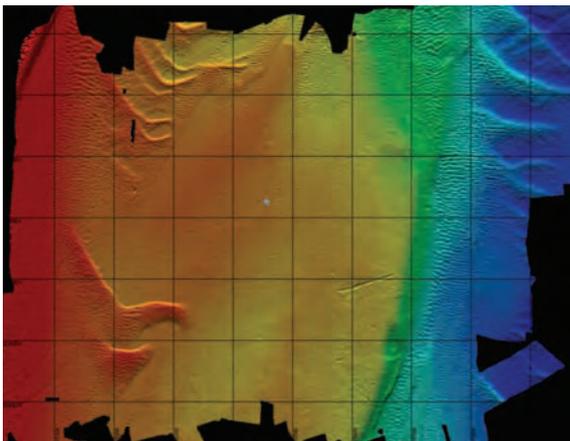


- Shallow water hydrographic surveying
- Inspection of underwater infrastructures
- Detection and mapping of objects and debris
- Detailed dredging and construction surveys
- Environmental studies and habitat mapping
- Mapping of harbours, inland waterways and shipping channels

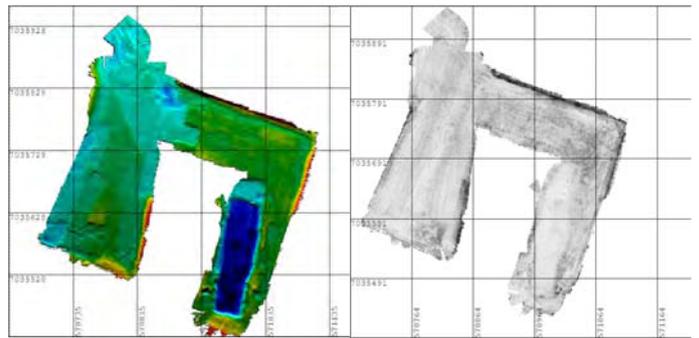




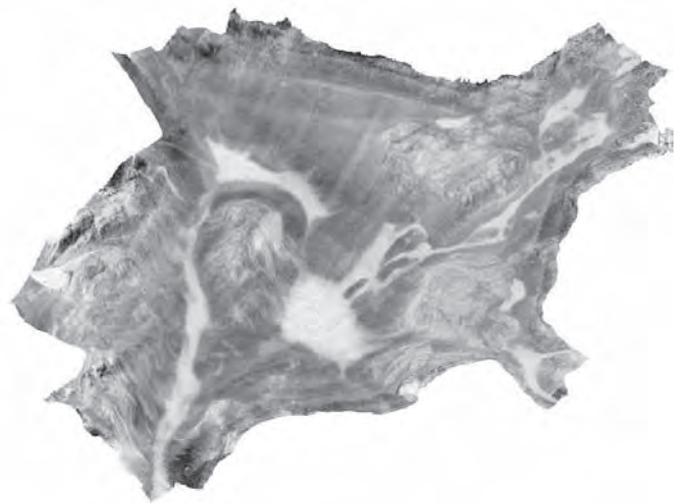
River Surveys
Often a single pass is sufficient to map a river from bank to bank.
NGU - Norwegian Geological Service.



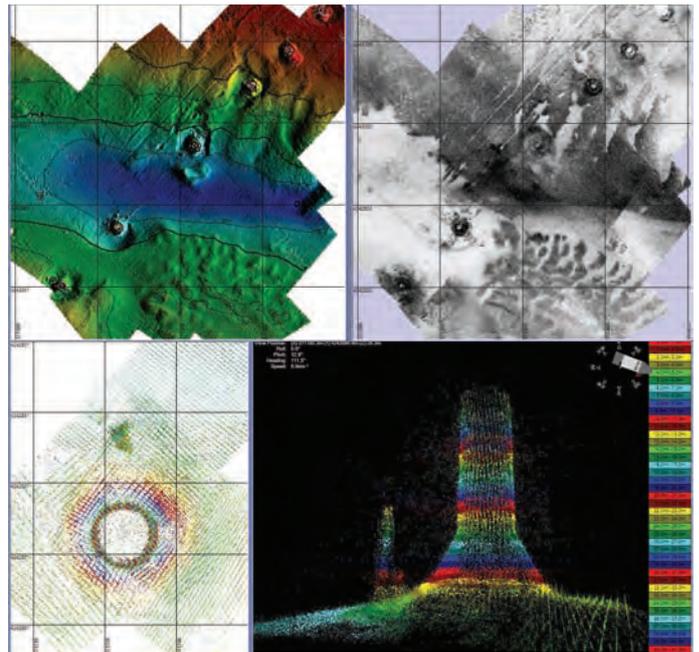
Environmental
Sand wave fields in the vicinity of a planned harbour entrance



Dredging survey
Port maintenance and object detection in the Port of Trondheim, Norway.



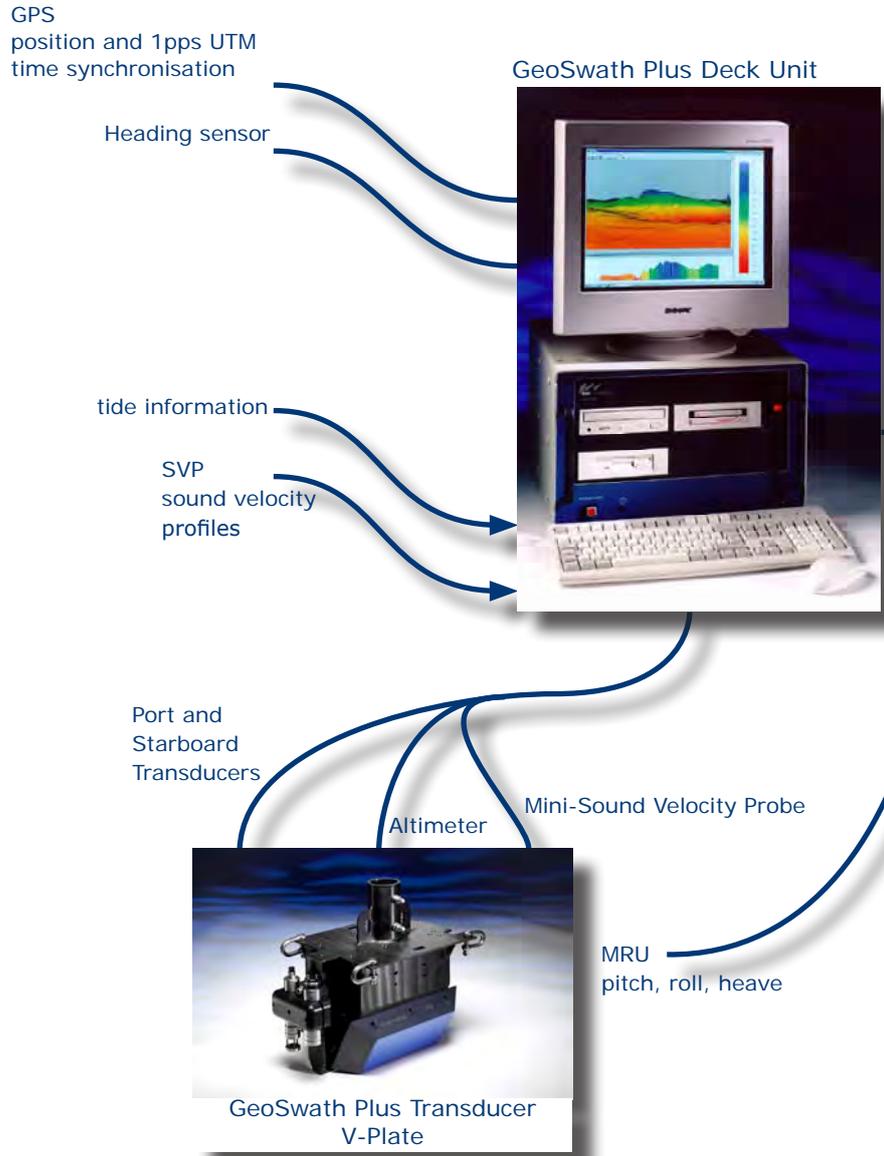
Environmental
Side Scan data draped over the digital terrain model showing sediment infill into a Norwegian Fjord. NGU- Norwegian Geological Service.



Infrastructure survey
Imaging of pillars and sediment features of a bridge crossing.

System Configuration

- Deck unit and dual transducer head included
- Interfaces to all major peripheral sensors
- Motion compensation
- Sound velocity compensation
- Tide compensation
- Geo-referencing



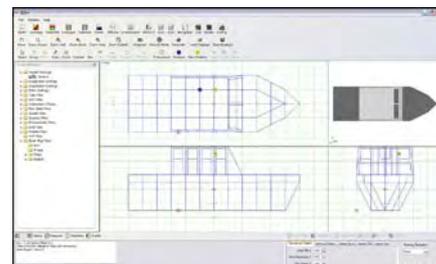
The GeoSwath Plus turn-key solution comprises a dual transducer head with versatile mounting options together with a deck unit containing the complete sonar electronics together with a high spec PC, running the GeoSwath Plus software. The software provides full acquisition, calibration and data processing capabilities for producing the final bathymetry and side scan data products. All customary ancillary sensors can be directly interfaced. The rugged port and starboard transducers, available in three frequency options (125, 250, 500 kHz), can be attached to a supplied sonar head assembly for boat over-the side or bow-mount options, which also can accommodate a range of ancillary sensors. Alternatively they can be deployed on bespoke boat hull mount assemblies. The compact deck unit contains the complete system electronics as well as a high spec PC. All peripheral sensors are interfaced directly.

GeoSwath Plus Software

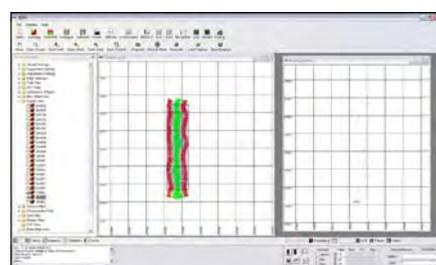
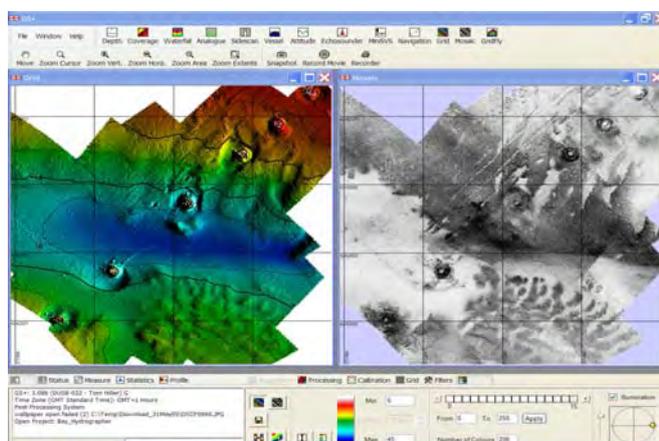
GeoSwath Plus is supplied with a complete software package for data acquisition, system calibration, data processing and generation of digital terrain models as well as side scan mosaics. Data quality control and visualisation are also an important part of the package.

As an alternative GeoSwath Plus can be operated using all major survey software suites.

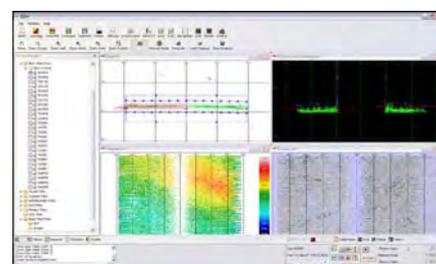
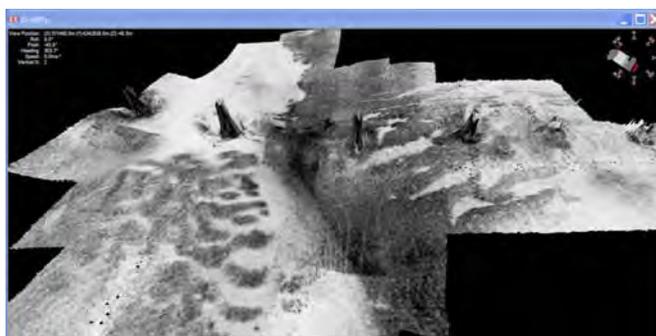
Data can be exported in all customary formats allowing it to be processed, visualised and incorporated into any processing stream. This includes the generic sensor format, allowing CUBE processing algorithms to be applied.



System set-up
A graphical user interface helps to set-up GeoSwath Plus and its ancillary sensors for survey work.

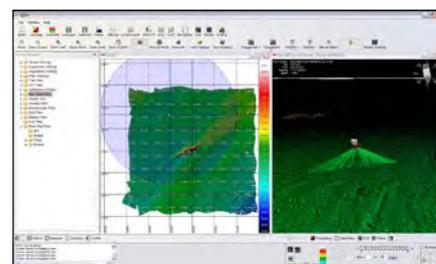


System calibration
Automated area based patch test calibration makes it easy to calibrate the sonar system.



Data processing
A set of specific filters allows removal of outliers and noise before passing the bathymetry data on to the gridding process. Tidal, motion and sound velocity corrections are applied

- Full software suite included with the system
- Complete system set-up and calibration, acquisition, processing, visualisation, production of digital terrain models and side scan mosaics
- Interfaces to all major acquisition and processing packages
- Windows based, XP and Vista



Data visualisation
Digital terrain models and side scan mosaics can be visualised and assessed using a range of tools including 3D views.

GeoSwath Plus AUV and ROV

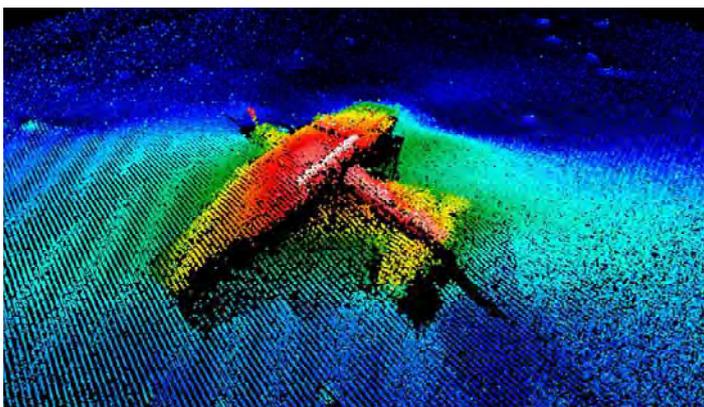
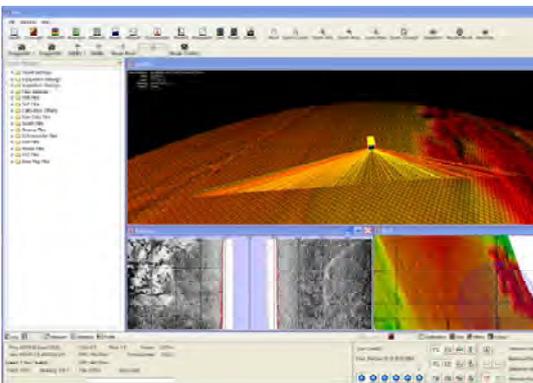
Payload modules of the GeoSwath Plus with depth ratings of up to 4000 m are readily integrated into any autonomous underwater vehicle (AUV) or Remotely Operated Vehicle (ROV). With a data coverage of up to 12 times the vehicle's fly height and its low power consumption it offers unsurpassed efficiency for all military and civil survey applications.

The GeoSwath Plus AUV module contains the sonar electronics together with a high-spec small form factor PC, including local data storage, which can operate free running or interfaced to the AUV's control and peripheral sensors using Ethernet and Serial connections. The small size port and starboard transducers can be mounted directly to the module or onto an alternative position on the vehicle.



The compact GeoSwath Plus ROV module is interfaced to either a laptop PC or a deck unit on-board the survey vessel via a transparent Ethernet connection. Peripheral sensors can be interfaced either to the module or to the deck unit. The small size port and starboard transducers are mounted on flying leads onto the platform, giving full flexibility to allow choice of a low noise environment.

The included software package provides easy system set-up full acquisition, calibration and data processing capabilities for producing the final bathymetry map and side scan mosaic data products.



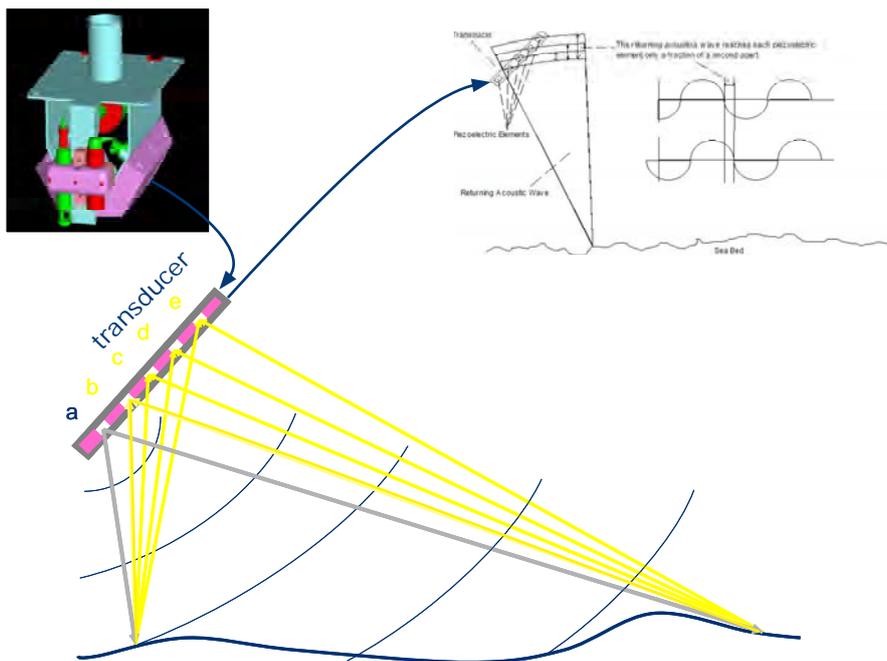
- Up to 4000 m depth rating
- Reliable bathymetry and side scan payload sensor
- Frequency versions 125, 250 and 500 kHz
- Easy integration into all ROV and AUV through standard interfaces
- Compact and light
- Low power consumption (50 W operation, 20 W stand-by)
- Hydroid Remus 100 module available

Sonar Technology

The GeoSwath Plus is a Phase Measuring Bathymetric Sonar System. It simultaneously acquires swath bathymetry and side scan data. Its dual transducer configuration has a field of view of over 240°. The usable depth information is limited only by the strength of the signal scattered back from the seafloor, thus achieving a swath coverage of up to 12 times the water depth.

The transducer comprises five ceramic staves, one transmit and four receive staves. The active staff transmits the signal. One receive staff registers the amplitude of the signal scattered back from the seafloor, acquiring side scan data and the four staves together determine the phase difference in the received signal and from that the direction to the scatter point. In combination with the range determined from the travel time measurement this results in depth measurement.

The phase measuring algorithm determines the direction of the returning sound with an angle resolution of a fraction of a degree (c. 0.03°). The range is found from the timing and measured to millimetre accuracy. The data shows a density of 40 samples per metre slant range. These performances assure accuracy to the latest IHO standards for bathymetric surveying.



Features

- Ultra high resolution swath bathymetry
- IHO SP-44, special order
- Co-registered geo-referenced side scan
- Frequency versions: 125, 250, 500 kHz
- Up to 12 times water depth coverage
- 240° view angle
- Dual transducer set-up with versatile mounting options
- Full software solution included: data acquisition, processing, presentation
- Interfaces to all customary peripheral sensors
- Interfaces to all customary software packages



Technical specifications

GeoSwath Plus	125 kHz	250 kHz	500 kHz
max Water Depth Below Transducers	200 m	100 m	50 m
max Swath Width	780 m	390 m	190 m
max Coverage	up to 12 x depths		
Depth Resolution	6 mm	3 mm	1.5 mm
Two Way Beam Width (Horizontal)	0.85°	0.75°	0.5°
Transmit Pulse Length	128 µs to 896 µs	64 µs to 448 µs	32 µs to 224 µs
max Swath Update Rate	30 per second (range dependant)		
Transducer Dimensions	540 x 260 x 80 mm	375 x 170 x 60 mm	255 x 110 x 60 mm
Transducer Weight	11.6 kg (in air) 3.3 kg (in water)	3.8 kg (in air) 1.8 kg (in water)	1.5 kg (in air) 0.5 kg (in water)

GeoSwath Plus AUV	125 kHz	250 kHz	500 kHz
Power Requirements	24 VDC, 50 W (at max ping rate), 20 W (standby).		
Max Depth Rating	standard 1000 m optional up to 4000 m		
Electronic Module Size	20 cm OD x 36.6 cm long, bespoke		
Electronic Module Weight	12 kg (in air), 3 kg (in water).		
Data Storage/Retrieval	120 GB hard drive, 10/100/1000 BaseT Ethernet link		
Mission Endurance	12 hour data collection		
Interface to AUV	Ethernet (2 x 1 Gbit Ethernet ports available), RS232 for ancillaries		

GeoSwath Plus ROV	125 kHz	250 kHz	500 kHz
Power Requirements	24 VDC, 50 W (at max ping rate), 20 W (standby).		
Max Depth Rating	standard 1000 m optional up to 4000 m		
Electronic Module Size	20 cm OD x 36.6 cm long, bespoke		
Electronic Module Weight	12 kg (in air), 3 kg (in water).		
Data Storage/Retrieval	120 GB hard drive in module, 10/100/1000 BaseT Ethernet link		

We are always there, wherever you need us

GEOACOUSTICS customer services organisation is designed to provide high-quality, global support, whenever and wherever it is needed. We are committed to providing easy access to support and service, and to responding promptly to your needs.

GeoAcoustics support and service activities are supervised from our headquarters in the United Kingdom, with service and support centres at strategic locations around the globe – where you are and the action is. As part of our commitment to total customer satisfaction, we offer a wide variety of services to meet the individual customer's operational needs. GEOACOUSTICS OFFERS 24 hour support

Global and local support

We provide global support from local service and support facilities at strategic locations world wide.



Solid competence reduces cost

We have always recognised the importance of supporting our products and systems with professional training.

A range of courses are therefore offered to ensure that you achieve the goal of full system utilisation with safe and efficient operation.

Upgrading that pays

Product and system upgrades can improve your vessel operations and reduce your overall maintenance costs. We will ensure that existing products and systems can be extended or upgraded based on standard upgrade kits.



Support 24

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