# Delph

Seabed Mapping Software Suite

Delph Seismic, Delph Sonar and Delph Mag are complete software packages with dedicated acquisition, processing and interpretation components. They operate with any side-scan sonar systems, seismic systems, sub-bottom profilers, magnetometers and gradiometers.

Delph software is a major leap forward in providing geologists, geophysicists and hydrographers with a highly optimized workflow. It offers greater flexibility, a major boost in productivity, and top-level multi-sensor data quality control (QC).
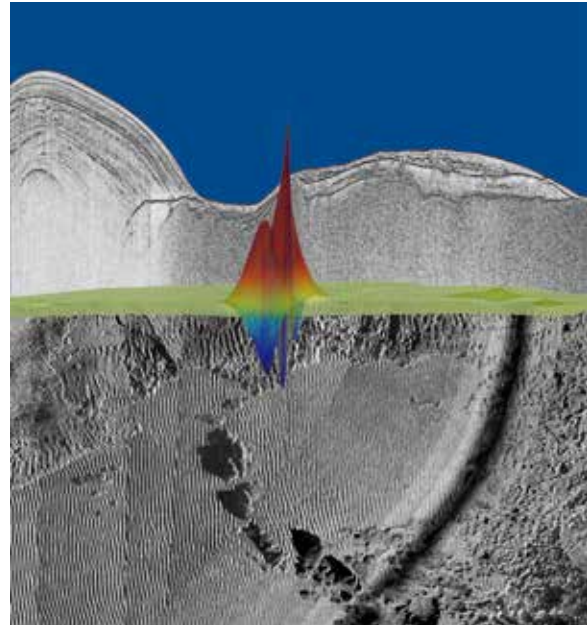
FEATURES

· Simplified data acquisition software
· Global profile views with zoom and pan
· Batch processing and reporting capabilities
· 3D multi-sensor data integration

BENEFITS

· Robust and safe acquisition of raw data
· Flexible and reactive analysis and interpretation tools
· Optimized workflow for greater productivity
· Survey-scale quality control and interpretation

APPLICATIONS

· Geophysical exploration
· Geotechnical investigation
· Structural geology
· Cable route survey
· Hydrographic survey
· Habitat mapping
· Pipeline inspection
· Unexploded ordnance survey
· Marine archaeology

ABOUT DELPH SOFTWARE SUITE

For more than 25 years, Delph software suite has been extensively used by surveyors and geophysicists around the world, providing leading edge software and hardware solutions.

Delph acquisition software is a unified data logging solution to safely monitor and record side-scan sonar, seismic and sub-bottom profiler data in a resolutely simplified user interface. It focuses on reliability and online QC.

Delph interpretation software brings a new workflow to geophysical data processing and integration; it has the unique capability of handling vast amounts of data in a short time using batch processing while still providing access to the finest details.

Delph interpretation is the unbeatable solution when processing time is critical. From raw data to final deliverables, all sonar, sub-bottom, magnetometer, bathymetric data and geographical layers integrate in Delph RoadMap 3D geographic visualization for an advanced QC on a global survey scale. This also ensures the best possible geo-referencing and immediate compatibility with geographical information systems. With scrolling of profiles no longer needed, you can directly access complete datasets, always geo-referenced.

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DELPH SEISMIC

Delph Seismic is the most complete acquisition, processing and interpretation software package designed to provide geologists and geophysicists with easy access to all data collected from high-resolution seismic systems and sub-bottom profilers.

ACQUISITION

Delph Seismic acquisition is a robust data logger for high-resolution seismic and sub-bottom profilers. Easy setup and raw data QC functions ensure that optimal data quality is safely recorded.

Features
· All analog seismic sources
· Digital sub-bottom profilers
· Quality control indicators
· Master/slave acquisition modes
· Easy interfacing to navigation data
· Raw data logging to XTF and SEGY
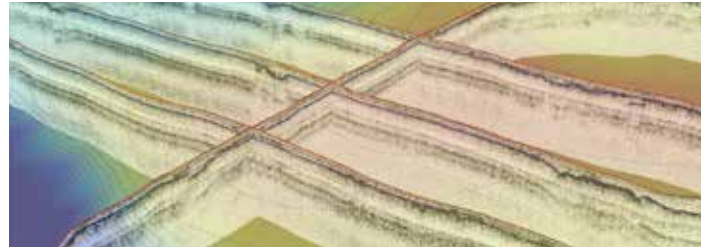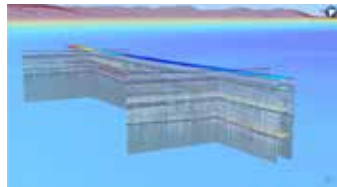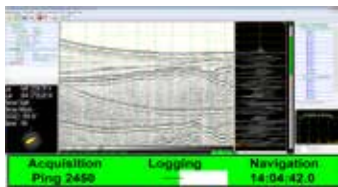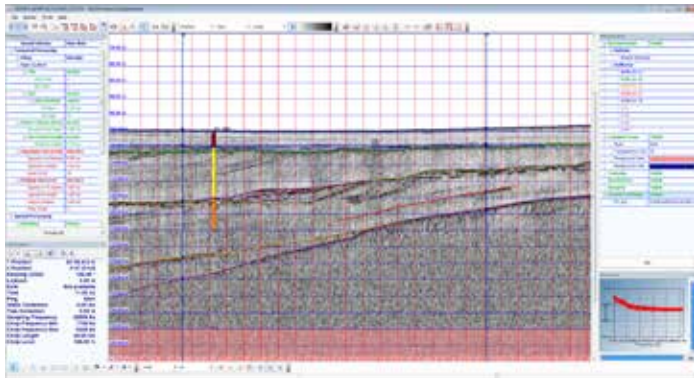
INTERPRETATION

Delph Seismic interpretation is a full-featured processing, interpretation and 3D mapping software package for any type of industry-standard sub-bottom profiler and high-resolution seismic data. Delph Seismic interpretation embeds high-level processing and interpretation functions. Its 2D profile view and 3D geographic visualization provide global survey data processing and interpretation QC.

General
· Opened to all SEGY and XTF formats
· Global profile display with zoom and pan

Processing
· Extensive data processing library
· Complete vertical data correction
· Processed data available in SEGY
· Batch data processing

Interpretation
· Complete data interpretation tools
· Automatic seabed and horizon tracking
· Ground-Truthing (Core Logs) 2D/3D data integration
· Cross sections display and browsing
· Batch interpretation and raster export

Mapping
· 3D geo-referenced interpretation display
· 3D synchronized cursor link
· 2D/3D manual annotations and contouring
· Terrain model generation from reflectors
· Isopach map and contours generation
· Bathymetry modeling from XYZ data
· Navigation and background layers

DELPH SEISMIC ANALOG ACQUISITION UNIT

Delph Seismic Analog Acquisition Unit is the latest topside generation for acquiring analog seismic data. Embedding all necessary inputs and outputs, it accurately digitizes single to multi-channel seismic signals. Thanks to a single Ethernet output, acquired data is logged by any laptop or workstation running Delph Seismic Acquisition software. This is a new standard for high-resolution seismic surveys with simplified integration, maintenance and operation.

FEATURES

- Single to multi-channel analog seismic
- Master and slave triggering modes
- 24-bit digitizing accuracy
- RS-232 inputs, Ethernet output
- Available as rack and portable system
- DELPH Seismic Acquisition included

BENEFITS

- One single topside for sparkers, boomers and SBPs
- Seamless interfacing with existing systems
- Calibration free analog to signal converter
- Single digital connection to any computer
- Suitable for mobile and permanent setups
- Complete plug & play acquisition topside

APPLICATIONS

- Geophysical survey
- Aggregate resource assessment
- Pipeline and cable route survey
- Coastal engineering
- Ports, harbours, inland waterways survey
- Marine Archaeology
- Wind farm and renewable energy installation site survey

Inputs & outputs

Acoustic

Seismic input channels	Up to 4, 8, 12 and 24 channels (BNC or multi-point connectors)
Resolution / Dynamic	24-bit (true 21-bit), 118 dB
Input Range	±10 Volts
Sampling Frequencies	1 to 64kHz

Additional Connectors

Internal Synchronization (master)	TTL signal (BNC)
External Synchronization (slave)	Configurable TTL signal (BNC)
Auxiliary Sensor Input	x2 configurable RS232 ports (DB9)
Digital Data Output	10/100 Mb Ethernet port (RJ45)

Software

Acquisition software	Delph Seismic Acquisition included
File formats	32-bit SEGY and XTF

Physical characteristics

Form Factor	Rack-mounted unit or mobile system
Analog Acquisition Unit Dimensions (4 and 8 channels)	W/H/D: 19", 3U, 35 cm; Weight: 5 kg
Rolling Rack Dimensions	W/H/D: 59.7 x 30.5 x 47 cm; Weight: 10,6 kg

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19" Rack configuration

1 - Seismic Analog Data

2 - Sub-bottom Profiler

3 - Trigger - internal & external

4 - Navigation x2 RS232 Port

5 - Delph Ethernet link

DELPH SONAR

Delph Sonar is a complete acquisition, processing and interpretation software package designed to easily perform accurate and productive side-scan sonar surveys. Providing an optimal QC at any stage and relying on Delph powerful workflow and ease-of-use, side-scan sonar mapping has never been so fast.

ACQUISITION

Delph Sonar acquisition interfaces to most analog and digital side-scan sonars. With a dedicated interface for each, it provides a unified data logger to record raw data in industry standard XTF format.

Features
· Opened to most digital side-scan sonars
· Driver-based interfacing
· Single and dual frequency support
· Easy interfacing to navigation data
· Quality control indicators
· Raw data logging to XTF format
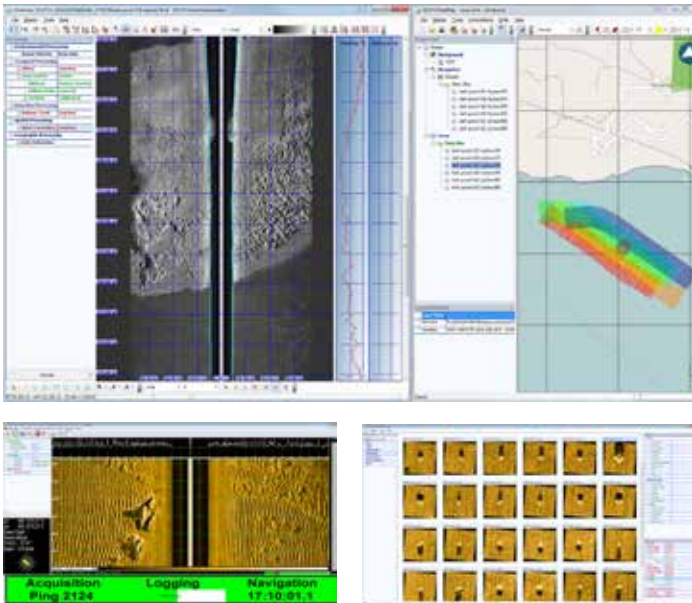
INTERPRETATION

Delph Sonar interpretation is a dedicated tool for processing, analyzing and mapping any side-scan sonar data. Highly productive, it embeds high-level processing and benefits from Delph batch processing and mosaicking capabilities. The 2D profile view and 3D geographic visualization provide global QC and fast integration with other data types.

General
· Opened to industry standard XTF formats
· Global profile display with zoom and pan

Processing
· Complete and fast data processing
· T.V.G. gain calibration on sonar data
· Fine bottom tracking tools
· Batch data processing

Interpretation
· Complete data interpretation tools
· Target picking on the profile or a mosaic
· Advanced contact management and classification
· Batch interpretation reporting

Mapping
· 2D/3D coverage map
· 3D synchronized cursor link
· Batch sonar mosaicking to geo TIFF
· Sonar mosaic comparison tools
· Surpervised sonar mosaic classification
· 2D/3D manual annotations and contouring
· Geo-referenced sonar targets
· Contact map generation
· Bathymetry modeling from XYZ data
· Navigation and background layers


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DELPH SAS

Delph SAS streamlines synthetic aperture sonar processing within the industry leading Delph Sonar Interpretation software. Advanced side-scan sonar processing, mapping and analysis now shares common tools with regular side-scan sonars and benefits of Delph optimized workflow.

OPTIMAL POSITIONING

Delph SAS advantageously combines subsea positioning equipment such as Inertial Navigation System and its ancillary sensors together with surface positioning from USBL equipment. This results in highly accurate and robust positioning of sonar data in all survey conditions.

Features

· Accurate absolute positioning in real-time
· Full resolution INS-based navigation and motion compensation
· Real-Time USBL data fusion (optional)
· Micro-navigation computation
· Native production of industry standard XTF records and geoTIFF mosaics
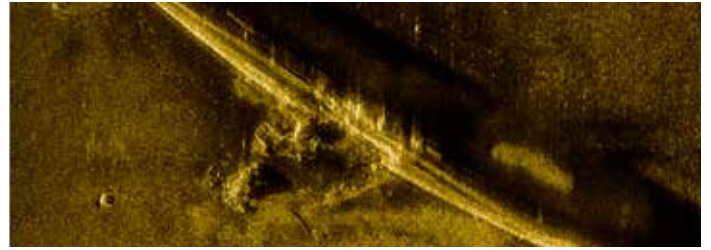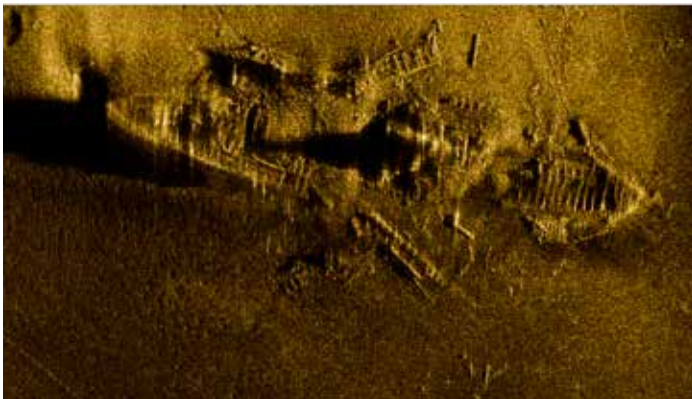
SUPERIOR SEAFLOOR IMAGING

Delph SAS makes the best from raw SAS data, providing superior resolution and larger range capability compared to conventional side-scan sonars. Both the robust quality mosaicking mode that is ideal for classification and target detection, and the high resolution mode for target characterization offer full-coverage whatever the navigation. The optional Gap-Filler sonar integration allows for full swath imaging cability, thus allowing better efficient survey strategies, saving time and cost while providing superior results.

Features

· Robust SAS processing against sonar motion
· Natural 100% across and along-track coverage at any speed
· Co-registered Gap-Filler, sub-bottom profiler and bathymetry data (optional)
· SAS multi-channel beam-forming
· Spatial multi-ping integration
· SAS reprocessing capability in DELPH Sonar Interpretation
· User-choice of « quality » (classification) and « resolution » (detection) processing at any resolution.
· Optimized multi-core parallel processing

Interpretation

· Native production of standard XTF records and geoTIFF mosaics
· Delph Sonar target analysis and databasing tools
· Manual and automated seabed classification
· Batch data processing
· Seamless integration with conventional survey data
· Multi-sensor data integration

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DELPH MAG

Delph Mag locator is a unique operational solution for the mapping of buried objects; in a few comprehensive steps, it filters and maps magnetic anomalies. Although requiring no prior expertise in magnetic science, it provides an accurate magnetic anomaly map to locate magnetic sources.
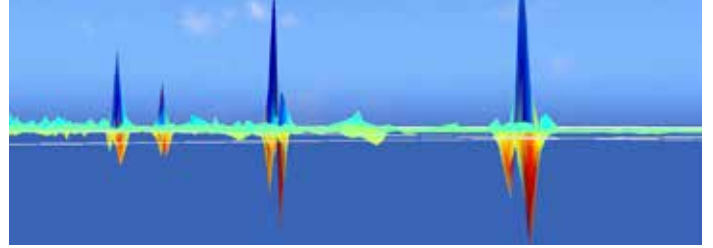
MAGNETIC ANOMALY MAPPING

General
· Generic ASCII import and XTF data format
· Survey oriented configuration
· 32-bit geoTIFF map output

Processing
· Navigation and geometry correction
· Diurnal correction from reference station of by filtering
· Magnetic anomaly modeling and mapping
· Magnetic anomaly map modeling
· Analytic signal map modeling
· Reduction to the pole map modeling
· Batch data processing

Interpretation
· Generic data interpretation tools from maps
· Combined multi-Sensor interpretation with side-scan sonar, sub-bottom and bathymetry data

Mapping
· 2D geo-referenced anomaly vector display
· 2D/3D magnetic map display from generated models
· Iso-contours generation from all maps
· Bathymetry modeling from XYZ data
· Support for any data type and geographical layers
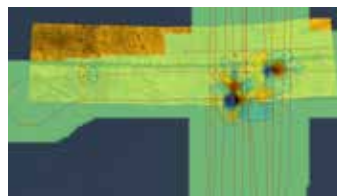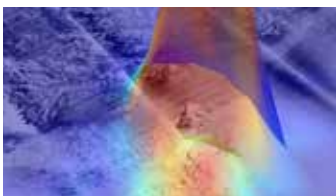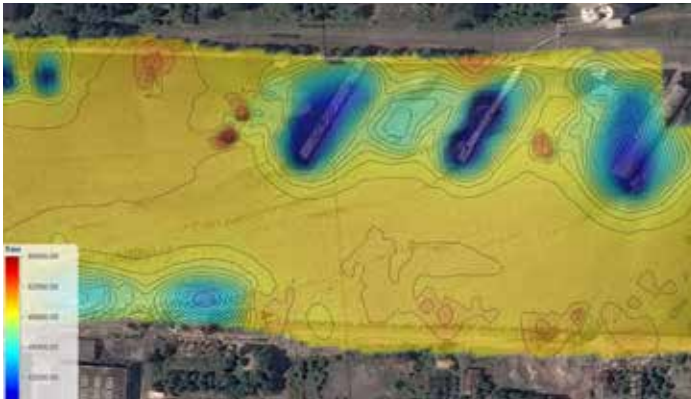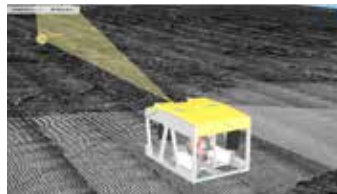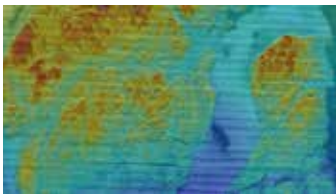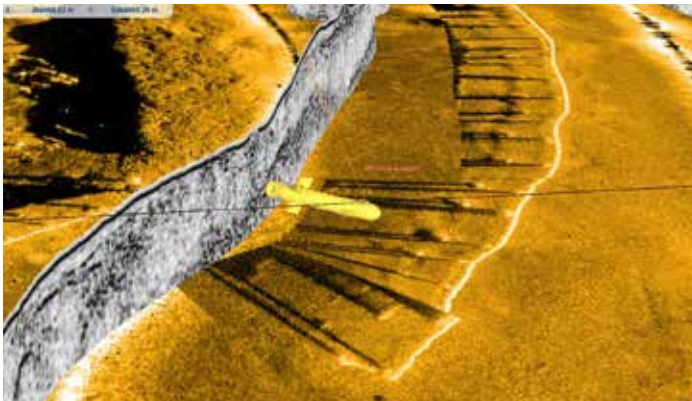
DELPH ROADMAP

Delph RoadMap is featured with all Delph software and provides advanced real-time and offline data display in a powerful 2D/3D cartographic environment.

NAVIGATION

Delph Roadmap connects to GPS and iXblue positioning sensors to provide real-time and offline trajectory display.

Features
· Support for virtually all geodetic systems
· Connection to single or multiple positioning equipment and
· DELPH Acquisition software
· 3D models for realistic vessel and sensor display
· Configurable track history
· 2D/3D cartographic display
· 2D relative view from above or versus depth
· Real-time 3D measurement
· Range display for LBL positioning applications
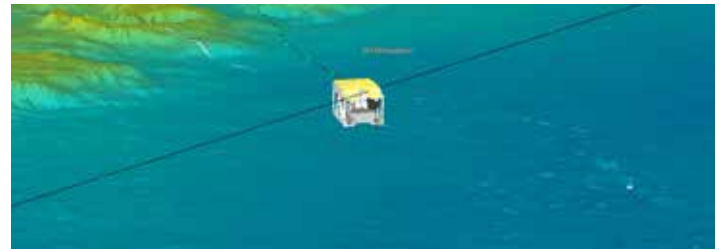
GEOPHYSICAL DATA

Delph Roadmap imports any geographical and geophysical data, provides an easy access to DELPH Interpretation tools and displays all cartographic results. Map interpretation tools allow creating rich interpretation from any map available.

General
· Project organization with sensor oriented themes in the project
· Support for any XTF and SEGY data
· Support for most common GIS and CAD layers

Processing
· Integrated access to DELPH Seismic, Sonar and Mag Locator batch processing and reporting functions
· Bathymetry gridding from XYZ data

Display
· 2D/3D display of all data
· Configurable layout and vertical exaggeration
· Coverage map display for all sensors
· Side-sconar mosaic preparation tools
· 3D display of sub-bottom data interpretation
· 2D/3D display of magnetic anomaly maps
· 2D/3D display of bathymetry models
· Iso-contour and cropping tools for all maps
· Common 3D synchronized cursor link
· Licence-free project review

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