

Seismic and sidescan interpretation ...

Whether at the sharp end online or tackling terabytes of data back at the office, Coda GeoKit is recognised as the survey industry tool for slashing reporting time. More accurate, consistent interpretation and the security of knowing each and every feature can instantly be retrieved from the database for audit are some of the many benefits that working digitally brings.

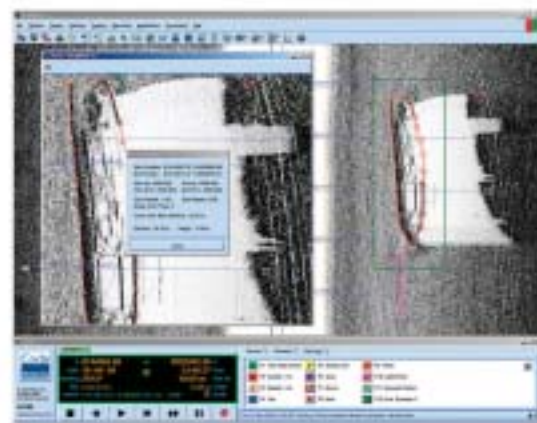
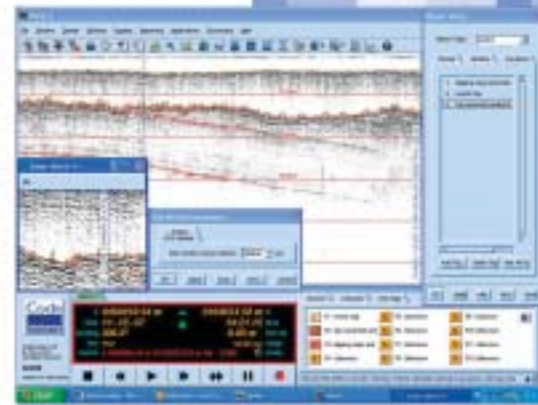
Designed by geophysicists for geophysicists, the three GeoKit modules in the Coda GeoSurvey range are each tailored for the task in hand.

GeoKit Sidescan is ideal for picking hundreds of targets online utilising the highest data resolutions that the waterfall display provides. ASCII and DXF outputs reduce revisions and endless QC.

GeoKit Seismic rapidly turns data into interpreted sections. Embed true-scale TIFF images of the data into your charts to present the interpretation in context.

GeoKit on Mosaic draws the multiple strands together, enabling sediment boundaries to be mapped seamlessly over your survey area or multiple returns from the same target to be resolved.

Whatever the size of your survey task, you can be sure Coda GeoKit will get you the results you need more precisely, repeatably and most of all, far faster than you dare to imagine.



KEY FEATURES

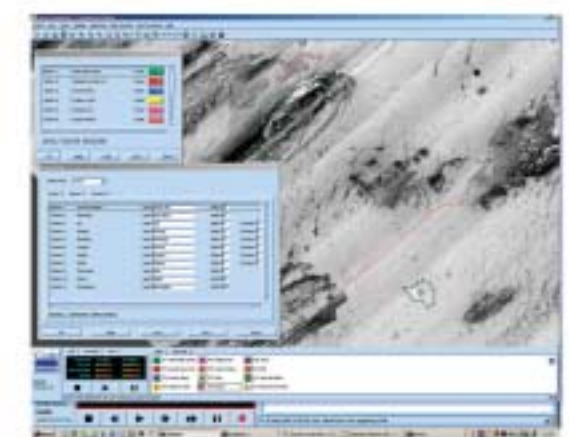
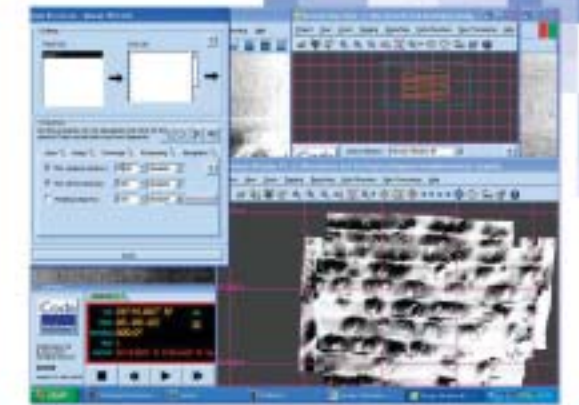
- Real-time interpretation:** Tag features as you map them, re-apply smoothed navigation later
- Off-line analysis:** Select one, many or all of your lines to compare against known feature positions
- Custom event palette:** Pre-set over a thousand tag types each with their own labels and properties
- Forced measures:** To ensure no feature's dimensions are missed, configure a tag to require a measurement
- Standardise feature sets:** Using Coda pre-loaded tag types or custom feature sets gives consistent interpretation across multiple project work stations – finally have your Geophysists working to a common standard
- Integrated interpretation:** Working on sidescan and seismic data simultaneously ties results together and saves time
- ASCII output:** Export pipeline database information to spreadsheets, reports and CAD/GIS packages
- DXF output:** Set up layers, line types, symbols and text sizes within DXF format for rapid transfer of vector graphics to charts and maps

High resolution seabed mapping ...

Combine lines of sidescan data in Coda Mosaic, near real-time or off-line, and you'll have the ultimate tool for analysing the whole survey at a glance. Large-scale seabed features will jump out of the screen. Zoom in to individual key areas, have multiple windows viewing data at different resolutions – really get to the bottom of your sonar data.

Many unique features of our mosaicing package lie within the powerful data manipulation options. Listening carefully to users' needs, we've developed an unmatched set of data editing tools whilst retaining an intuitive look and feel. Import a corrected position file from your navigation software or just choose from our smoothing and filtering options and let Mosaic do the number crunching. Combine this with GeoKit on Mosaic and you have the ultimate time-saving interpretation tool.

We've focused the output options on delivering the images and reports in a format your client is screaming for. With Coda Mosaic as part of your Productivity Suite mountains of survey data have never been easier to conquer.



KEY FEATURES

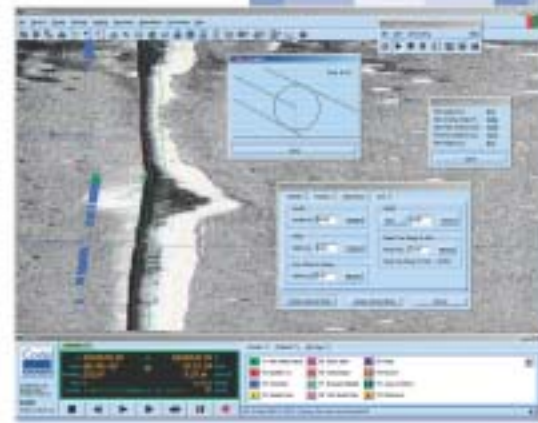
- Auto Mosaic:** Define the boundaries of the area you need to mosaic, highlight the files on your server, press 'Play' and walk away – the sonar mosaic will be built whilst you work on something else
- Data resolutions:** Powerful manipulation tools allow the project to be viewed in any resolution without having to re-enter or re-process the data set
- GeoTIFF output:** Choose the resolution in pixels per metre and the orientation of the GeoTIFF
- Navigation editing:** Powerful embedded navigation tools also allow you to edit navigation ping by ping
- Shine through:** Bring out hard returns on underlying data which has been masked by later lines
- Image editing:** Auto TVG balances image strength across the survey area giving seamless imagery
- Interpretation on Mosaic:** Import your swath-based GeoKit interpretation to GeoKit on Mosaic, adding and editing as you go. Output the finished targets on boundaries straight into your reports and charts

Automated pipeline inspection ...

Coda Pipeline Inspection is acknowledged by users as the best tool on the market for automated analysis of sidescan pipeline survey data.

The software automatically stores exposed pipe positions real-time whilst analysing the data for free spans. Online eventing with minimal operator supervision flags up critical span lengths and stores maximum span heights to a database. One quick review by the geophysicist verifies the interpretation and the client knows right then and there where to deploy an ROV for a closer look.

The integration of automated pipeline tracking, span detection and manual event editing makes this module essential for anyone involved in pipeline inspection work.



KEY FEATURES

- Auto-Track Pipeline:** Facility for pipelines to be tracked automatically during real-time or off-line processing
- Automated analysis:** Allows automated, real-time marking of pipeline freespans, burials and exposures
- Graphic clarity:** Consistently high quality, clear pipe graphics
- Event screen-dump:** Store spans, targets and areas of interest as a catalogue of TIFF images
- Definable attributes:** Allows user-defined critical span attributes prior to interpretation
- Off-line analysis:** The facility to add further analysis and interpretation manually off-line, such as marking near-pipe debris or events, before or after navigation correction has been applied to the data
- ASCII output:** Export pipeline database information to spreadsheets, reports and CAD/GIS packages
- DXF output:** Set up layers, line types, symbols and text sizes within DXF format for rapid transfer of vector graphics to charts and maps

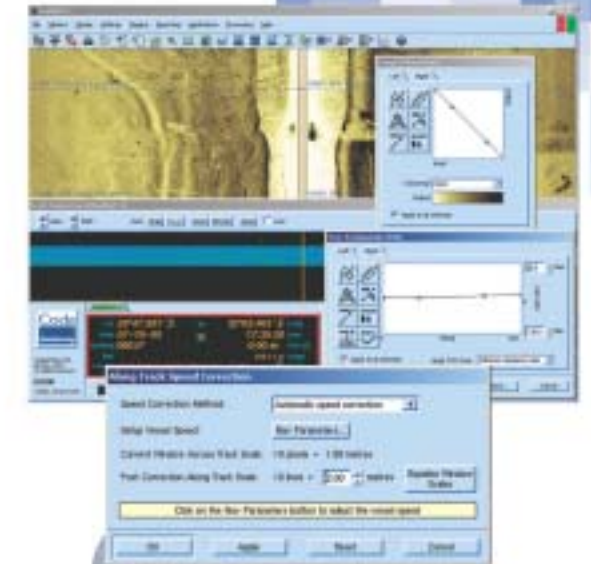
Rapid review and enhancement ...

All Coda GeoSurvey Productivity Suite software is built on our *Replay* backbone providing the simultaneous display of shallow seismic, sidescan and magnetometer data. Up to eight channels of data acquired in all standard formats (including CODA, SEG-Y, XTF) can be viewed and sent real-time to multiple printers.

Powerful display tools – easy to find and simple to use – are provided to make the most of your hard-won detail. Image enhancement, user defined colour palettes and noise filters all help to make the interpretation stand out. We've made editing the position of your data a cinch. Simply swap out time-based navigation files at the click of a mouse, or dig in deep and edit at the ping level.

What's more we've added a host of features requested by users at every level. Along Track Speed Correction compensates for vessel speed changes and – uniquely – enables you to match up sidescan and shallow seismic data ping by ping. Seismic data sets can be vertically referenced back to a datum, or the seabed shape restored from ROV motion. Using the continuous TIFF image output gives a seismic profile ready-scaled to drop in to your charts.

With the best resolution the industry can offer, easy image enhancement and superb navigation editing tools, it's all possible with Coda GeoSurvey Productivity Suite.



Productivity-enhancing features – right across the Suite:

- Ease of use:** Coda GeoSurvey software is widely recognised to be easy for the novice to use without compromising the rigorous demands of experts
- Integrated:** Simultaneous sonar, shallow seismic and magnetometer data display enables faster, more accurate and productive interpretation
- High resolution:** Coda GeoSurvey software has the industry's highest level of data resolution currently available
- Compatible:** All industry standard data formats are compatible with Coda GeoSurvey software
- Precise:** Individual ping level navigation correction gives the ultimate in flexibility and precision
- Multiple printers:** Simultaneous printing of multiple data streams
- Geodetic flexibility:** All standard survey spheroids, projections or datums are included in metres or US Survey feet
- Customer-led:** Influenced by user feedback at every level, Coda software is continually adapted to meet the changing needs of industry

Coda GeoSurvey Productivity Suite

Integrated geophysical data analysis

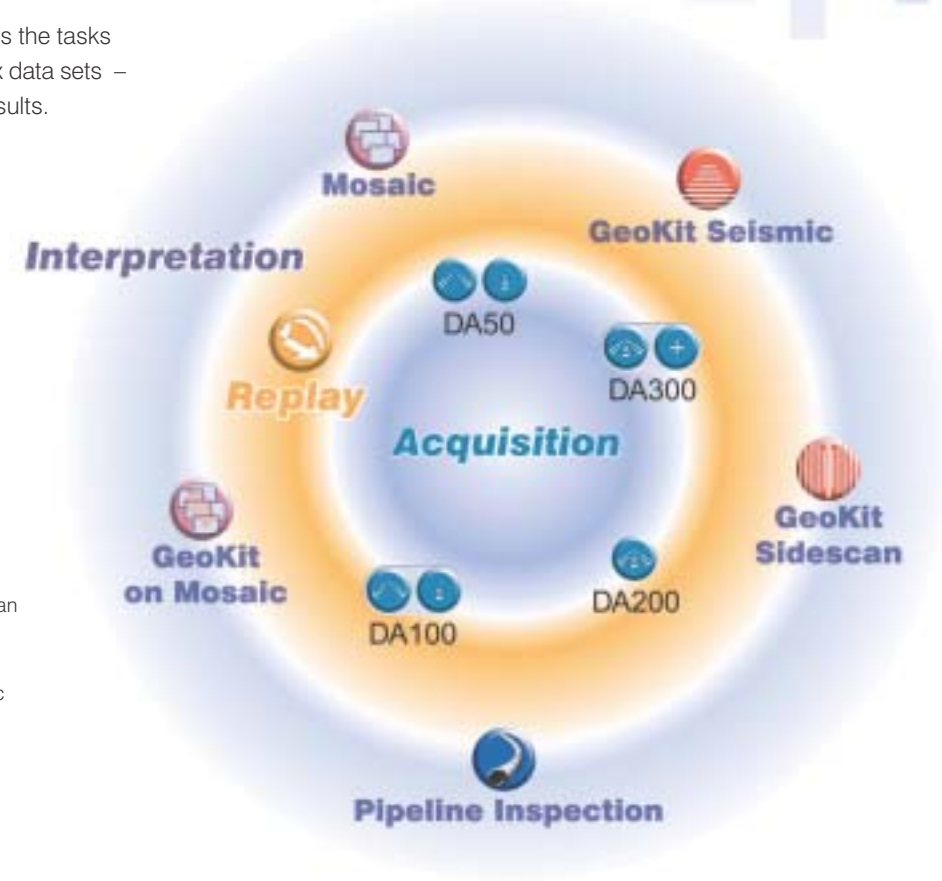
No matter how much raw data has been collected from the survey site, it's the results that your client values. With budgets getting tighter and tighter, survey tasks are becoming ever more time-critical and the process of interpreting acquired data must be as quick and easy as possible.

Coda GeoSurvey Productivity Suite integrates the tasks of analysing, tagging and mosaicing complex data sets – thereby ensuring faster and more precise results.

With Coda GeoSurvey running on multiple workstations with remote networked data storage, high volumes of geophysical data can be managed and processed quickly, maximising productivity.

The Coda GeoSurvey Range includes:

-  DA50 Acquisition – choose Seismic or Sidescan
-  DA100 Acquisition – switchable between seismic and sidescan
-  DA200 Acquisition – simultaneous seismic and sidescan
-  DA300 Acquisition – simultaneous seismic and sidescan plus third trigger
-  RE200 Replay – standard with all Coda GeoSurvey acquisition systems
-  GeoKit Seismic module
-  GeoKit Sidescan module
-  Mosaic module
-  GeoKit on Mosaic module
-  Pipeline Inspection module



Renowned Coda reliability and our dedicated 24-hour support team help to guarantee that you meet the demands of today's time-critical survey projects, no matter where in the world you are.



CASE STUDY

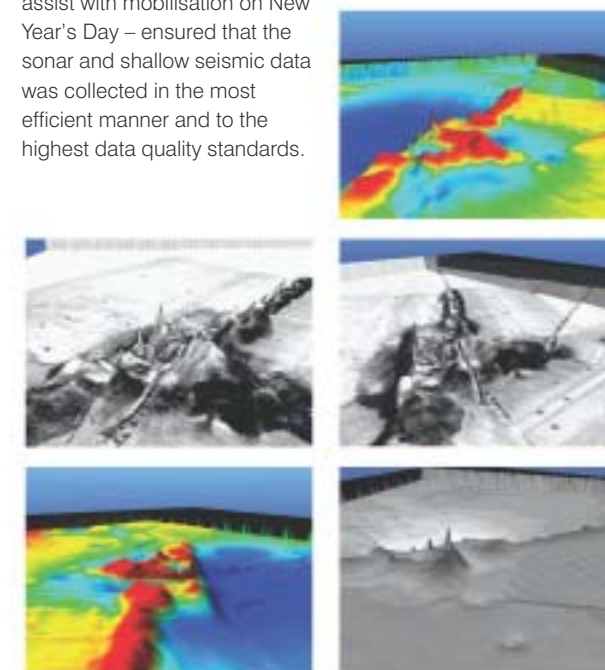
Geohazard engineering risk assessments in the Java Sea.

British Petroleum's Terang Sirasun oil and gas field sits on the Kangean shelf on the northern margin of the earthquake prone Bali Basin. Active faulting allows gas to leak to the surface and provides a source for gas pockets trapped within the soft near seabed horizons. Recent unconsolidated sediments with rugged seabed topography ranging from 100 to 350 metres also provide the potential for slope collapse and slumping. In preparation for infield construction to extend the field lifespan, Thales GeoSolutions Far East were commissioned to perform a comprehensive geohazard assessment survey.

Commencing in January 2001, over 2 terabytes of data were collected in a five-month survey campaign. Some 400 lines totalling 4383km were surveyed with multibeam bathymetry, sidescan sonar and magnetometer to map the surface hazards. At the same time shallow seismic data was collected using both a hull mounted 4x4 pinger, and a multi channel mini air gun source.

All the sonar and pinger data was recorded using Coda DA200 units and stored to a central snap server. Much of the sonar data was mosaiced on the vessel using Coda GeoSurvey Mosaic allowing both the Thales Data Manager and BP client representative to verify quality of coverage instantly thereby altering the survey plan in real-time to save on vessel usage. Ultra high resolution Coda mosaics were used to map the seabed with a high degree of confidence and these images were subsequently draped over 3-D views of the topography in a third party visualisation package enabling interpreters to assess features from any view point. The shallow seismic data was interpreted using Coda GeoKit providing rapid initial assessments of sediment thickness. Working closely with the Thales processing centre in Kuala Lumpur CodaOctopus adapted the seismic package to enable Thales to compensate for dynamic vertical offsets, thereby enabling processed data to be output in a format suited for 3-D viewing in specialised BP geohazard risk analysis software.

According to the Geophysical Project Manager, Kobi Brandeli, first class support from Coda – including flying out an engineer to assist with mobilisation on New Year's Day – ensured that the sonar and shallow seismic data was collected in the most efficient manner and to the highest data quality standards.



CASE STUDY

Monitoring the pipeline network spanning the North Sea.

Stringent European environmental and safety laws mandate regular inspections of all active unburred oil and gas flow lines in the North Sea – quite a task when the total pipeline network now exceeds 13,000km. Typically, annual sidescan sonar inspections are used to catalogue free spanning sections of pipe, sections of damage and debris to quantify areas requiring closer inspection by an ROV video camera. By feeding these results directly into a GIS database instant comparisons with historical surveys save the pipeline operators time and money whilst ensuring a safe and clean sea for future generations.

Tackling mammoth Shell annual inspection surveys for many years, Fugro Survey based in Great Yarmouth, (formerly Svitzer), have built their sonar data workflow around Coda GeoSurvey Productivity Suite with spectacular productivity improvements. According to Richard Salisbury, their Geoscience Manager, the Shell SPAIS contract work would typically have taken three months to interpret manually: with Coda GeoSurvey PI the results are generated offshore and a fully QC'd database is available directly from the survey vessel.



Each pipeline inspection season starts with a review of historical data to identify likely problem areas – geophysicist's scan rapidly through a Coda event database searching on target type, distance from pipeline,

and previously mapped spans to plan the upcoming season. With one of Fugro's dedicated survey inspection vessels towing a steerable Focus ROTV platform sidescan data is recorded by Coda DA200 units networked to a central vessel server. Maintaining an optimum sled distance from the pipeline enhances sonar data quality.

Coda GeoSurvey Pipeline Inspection online software stores exposed pipe positions all the while analysing the data for anomalies. Online eventing with minimal operator supervision flags up critical span lengths and calculates maximum span heights. One, quick, review by the geophysicist verifies the interpretation and the client knows right then and there where to deploy an ROV for a closer look. More accurate, reliably consistent interpretation with embedded data quality control and security of knowing each and every feature can instantly be retrieved for later audit means Fugro's clients, Shell UK, are delighted with all the extra benefits that working digitally brings.



Software upgrades

Customers are encouraged to take advantage of our Software Annual Maintenance Agreement (SAMA). This is free for twelve months after purchase of a Coda system or software and is renewable annually.

SAMA provides a number of key benefits:

- Free upgrades to the latest versions of software
- Revised manuals as soon as they become available
- QC documentation for procedural check lists for mobilisation
- Priority in defining new 'wish list' software features
- Input to the implementation of new software features
- System hardware upgrades at cost when technological improvements are available

SAMA means always having the latest Coda software and never being without the operational support you might need. This is in addition to unlimited 24-hour telephone, email and fax technical support.

24/7 support and advice

We've put a lot of effort into establishing a technical support procedure for our systems and software that delivers the help you need, when you need it – not just when it's convenient to us.

With a dedicated technical support team assisted by our in-house development staff and three highly experienced field geophysicists, CodaOctopus provides genuine 24-hour, 365-days-a-year support.

Those queries not resolved immediately are tracked within the ISO9001 compliant system central to our support process. This ensures every issue is pursued until the user is completely satisfied.

Technical support is currently free to all CodaOctopus customers, regardless of whether products are within warranty or not.

Training, field expertise and consultancy

All system purchases include one day's initial training at our locations in the UK or USA, free of charge. Additional training packages are available, tailored to suit your exact needs, provided either at a Coda office or your site.

Our field engineers are available to train your users in a work environment whilst actively assisting with data interpretation on your project.

We can also help before your project starts, by advising on other equipment you may need and best practice solutions. Our consultants have over fifty years of experience between them.

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SYSTEM REQUIREMENTS

Coda GeoSurvey will run over all Windows®-based networks on Windows® 2000 and Windows® XP

CodaGeoSurvey is also available under Linux Red Hat 7.3

Minimum hardware:

Pentium IV 1.4GHz processor
256MB RAM
40GB IDE hard drive
32MB graphics card
1024x768 pixel screen
Parallel printer port
Keyboard
Mouse

Recommended hardware for large mosaics:

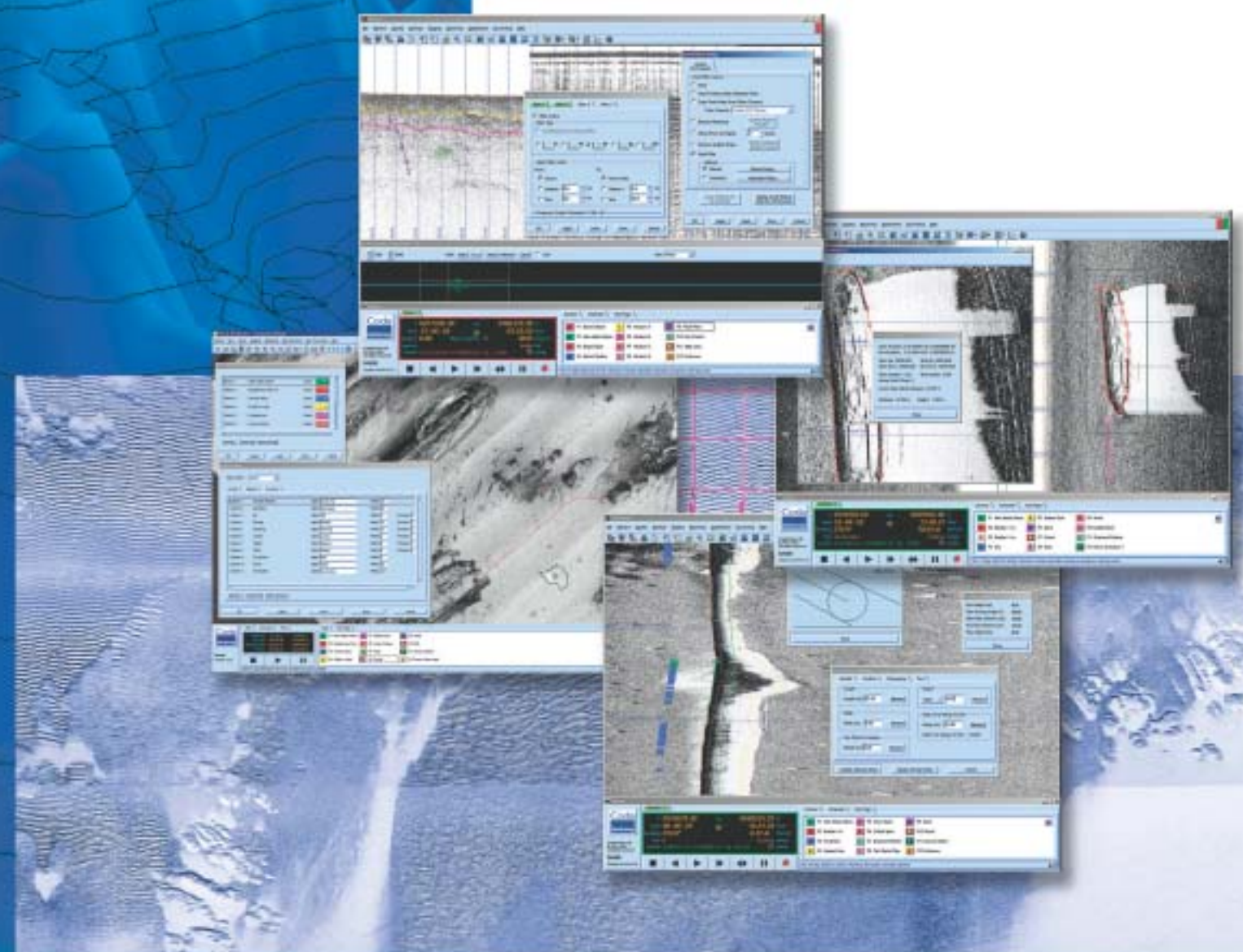
Pentium IV 2.4GHz processor
512MB RAM
80GB SCSI hard drive
128MB AGP graphics with Radeon 9600 Pro chip set
Dual monitor
Parallel printer port
Keyboard
Mouse
High speed network storage



Technical Support Form

Issue	Category	Priority	Status	Resolution
Software installation error	Software	High	Open	Investigating
Hardware compatibility	Hardware	Medium	Open	Investigating
Network connectivity	Network	High	Open	Investigating
Performance issues	Performance	Medium	Open	Investigating
Configuration problems	Configuration	Low	Open	Investigating
Documentation requests	Documentation	Low	Open	Investigating
Training requests	Training	Low	Open	Investigating
Consultancy requests	Consultancy	Low	Open	Investigating

GeoSurvey Productivity Suite



Integrated geophysical
processing, interpretation
and mapping tools

Coda
Leading GeoSurvey Solutions

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Leading GeoSurvey Solutions