APPENDICI

I MONOGRAFIE

Le pagine seguenti presentano le schede delle stazioni di riferimento utilizzate per la navigazione.

II SPECIFICHE TECNICHE DELLA STRUMENTAZIONE UTILIZZATA

Nelle pagine seguenti sono riportate le schede degli strumenti utilizzati per i rilievi batimorfologico e sismico multicanale.

Strumentazione per il rilievo batimorfologico:

- *Trimble 4000 SE DGPS System* - sistema di posizionamento differenziale
- *Robertson RGC 50 Gyrocompass* - girobussola
- *Simrad EA 300 P Echosounder* - ecoscandaglio
- *Submetrix ISIS 100* - sistema interferometrico acquisizione/processing dati batimetrici
- *Datasonics SIS 1000* - sistema di acquisizione dati Side Scan Sonar / Sub Bottom Profiler tecnologia Chirp
- *Geopulse Uniboom Model 5420A* - sistema di acquisizione dati di stratigrafia superficiale

Strumentazione per il rilievo sismico multicanale:

- *Sodera G.I. Gun*
- *Compair Reavell Compressor*
- *Air Reservoir*
- *ITI ST-5 Solid Towed Array*
- *Compass Bird Model 5011 - Digicourse*
- *Data Acquisition System DAS - 1 Oyo Geospace*
- *Lookout SeiScope Processing System*

TRIMBLE 4000 SE DGPS SYSTEM

Size	24.8 cm × 28.0 cm × 10.2 cm
Weight	2.7 kg receiver
	0.2 kg compact dome antenna
Power	Nominal 10.5 to 35 vdc, 7 watts
	Optional office support module for AC operation
Operating Temp.	-20 °C to +55 °C
Storage Temp.	-30 °C to +75 °C
Humidity	100%, fully sealed, buoyant
Accuracy	Typically less than 30 cm RMS: Low multipath environment
Compatibility	Corrections may be applied to all differential-equipped Trimble receivers
Tracking	9 channels of L1 C/A
Star-up time	Less than 2 minutes from power-on to tracking
Antenna	External antenna with 30 m RG213 cable
Data link rates	50-38,400 baud
RTCM message output	Types 1, 2, 3, 6, 16
Data recording	Corrections and all data available for archiving through RS-232 port up to 38,400 baud
Display	Backlit LCD with four lines of forty alphanumeric characters; Large, easy-to-read characters-2.8mm× 4.9mm; Total viewing area: 32 cm^2; Adjustable backlight and viewing angle
Keyboard	Alpha-numeric, function, and softkey entry
Cables	Lemo to DC and Lemo to DB-9 connectors, dual power input, dual BNC
Navigation	The navigation firmware enables waypoint-based route planning with deviation-from-track and distance-to-next waypoint available for 100 waypoints

QA/QC	Firmware option provides indications of accuracy in real time, including one sigma position error components as well as output via RS-232 serial port. Also included in the output data are DOPS, error ellipse parameters, E-N covariance and solution type indicators
NMEA-0183	ALM, BWC, GGA, GLL, GSA, GSV, RMB, RMC, VTG, WPL, XTE, ZDA
Ports	Dual serial; Triple power inputs; Antenna; and 1PPS output

ROBERTSON RGC 50 GYROCOMPASS

Master Compass	Height	253 mm
	Width	228 mm
	Depth	228 mm
	Weight	11.0 kg
Power supply unit	Height	142 mm
	Width	228 mm
	Depth	321 mm
	Weight	8.0 kg
Power source	Input	24V DC +/- 20%
Power supply unit	Output	AC110V +/-5V 400Hz
Damping	Frequency	72.4 +/- 7' (at latitude 35°)
	Damping factor	30 +/- 7% (at latitude 35°)
Gimbals freedom	+/- 45°	
Temperature range	-20°C to +50°C	
	Settling point error	1.8° sec. lat.
	Variation error	1.2° sec. lat.
	Settling time	4 hours
	Follow-up rate	Max. 36°/sec.
	Speed error	by chart
	Latitude error	by chart

SIMRAD EA 300 P ECHOSOUNDER

TRANSMITTER / RECEIVER

Frequencies	38 and 200 kHz
Output Power	38 kHz, 1000 W - 200 kHz, 500 W
Pulse Duration	38 kHz, 0.3 and 1 ms - 200 kHz, 0.1 and 0.3 ms
Max. p.r.f.	10 pulses/second
Bandwidth	Automatically adjusted to selected pulse duration
Matching Transducer Impedance	60 ohms

CONTROL AND DISPLAY

LCD (256x64 pixels) that presents	Main menu and submenu (six languages) Range settings and actual water depth Echogram
Range Scales	10-25-50-100-250-500 m
Scale Units	Selectable (feet, metres and fathoms)
Phasing	Manual or automatic, up to 8 times the selected range scale with 40% overlap
Gain	1-19 in 3 dB steps
Attenuator	0 or -15 dB
Transmitter Power	1/1, 1/20, 1/25
Sound Velocity	Adjustable (1400 to 1560 m/s) in 2 meter steps
Minimum Depth	0.5 m
Depth Digitising	Resolution 1 cm to 10 cm (depending on water depth)
Data Input Channel	Direct mode (all the input messages are output to echogram recorder and data output channel) Screened mode (only the interesting part of each position message can be output for storage)

Data Output Channel	The following data are printable and allow for automated decoding: -Water depth for each ping -Annotation -Event marker with numbers -Position

TRANSDUCER

Standard Transducer	Beam width, circular 7°, 200 kHz

COLOUR RECORDER

Recording's Feature	Echogram in 7 colours Indication of depth at top and bottom of paper Scale lines Annotations Event marker with numbers Verification of proper functioning
Recording paper	Plain paper, width 216 mm

GENERAL SYSTEM SPECIFICATION

Supply Voltage	20-50 V DCC
Power Consumption	50 W (standard version)
Ambient Temperature	0° C to +55° C (standard version)
EA 300 P Dimension	
Width	39 cm
Height	46 cm
Depth	56 cm
Weight	36 Kg
Colour Printer Dimension	
Width	40 cm
Height	10 cm
Depth	30 cm
Weight	7 Kg

SUBMETRIX ISIS 100

General Description

ISIS 100 is a fixed mounted system incorporating the benefits of the interferometric techniques. that include:

- Swath widths of up to 15 times water depth (typically in 10 m of water a swath corridor of 150 metres can be surveyed).
- Vastly increased data density (up to 2000 point per ping) are defined giving up to 36 milion sounding per hour.
- Higher accuracy and resolution than multibeam technology.
- Simultaneous true side scan data which can be output to thermal recorder and displayed on VDU.
- Faster survey speeds of up to 16 knots (depending on type of installation).
- Compatible with existing motion reference units.

The system can be mobilised quickly onto a vessel of opportunity (typically in 3 to 5 hours) or permanently installed as a hull mounted system. ISIS 100 has the ability to survey up to 300 degree arc. This enables data to be collected right up to the shoreline.

The main component of ISIS are a pair of sonar transducers, a motion reference unit, the ISIS main box, and a computer workstation. The main box contains four sub-racks; the Interface Unit, the Processor Unit, the Interface Equipment and the Tape Drive.
Data acquisition and processing are carried out in a network of Transputer microprocessors. These are located in the Processor Unit and Interface Unit.

Interface Unit

The main function of this unit is analogue and digital data acquisition of sonar and motion reference data. It contains:

- A sonar amplifier board, which takes in the analogue signal from the sonar transducers, and amplifies them. It also provides sidescan amplitude in digital form.
- An interface board, which receives the amplified sonar signal and measures the phase between them. It also receives the motion reference information on a serial data interface.

- A processor board, containing the Transputer modules responsible for data acquisition.
- A pair of transmitter board, which generate the sonar transmission pulse.

Processor Unit

This unit contains part of the Transputer system, performing real-time processing tasks. It drives the real-time data logging tape unit. Inputs from navigation system, etc., are accepted via serial ports. The unit includes diagnostic serial ports.

Ethernet Interface Unit

This unit comprises a B300 ethernet interface. It connects the transputer network to the computer workstation usinf ethernet TCP/IP protocol.

Tape Drive

All the acquired data is stored on a high-capacity Exabyte tape drive.

Computer Workstation System

The computer system serves as the man-machine interface. Commands may be entered via the mouse and keyboard. A range of displays is available, which allow the operator to monitor the operation of the sonar system.

The computer system can also be used to post-process the sonar data, and provide hard-copy charts and plots to printers and plotters. For this purpose, a tape drive is required to be connected to the computer. This may be a separate unit from the one connected to the Deck Processor, or one unit may be shared by swapping cables or switching.

The computer system may include one or more additional workstations, connected together by an Ethernet Network.

Attitude Measurement system

In order that the sonar returns can be interpreted in real-world co-ordinates, the orientation of the transducers must be precisely known. ISIS provides for interfaces to several industry-standard motion reference units. These provide the roll, pitch, heading and heave of the sonar transducers. They use three-dimensional arrays of accelerometers and gyroscopes to measure linear accelerations and rotational velocities respectively. Heading is usually provided by a link to an external magnetic or gyro-compass.

Configuration

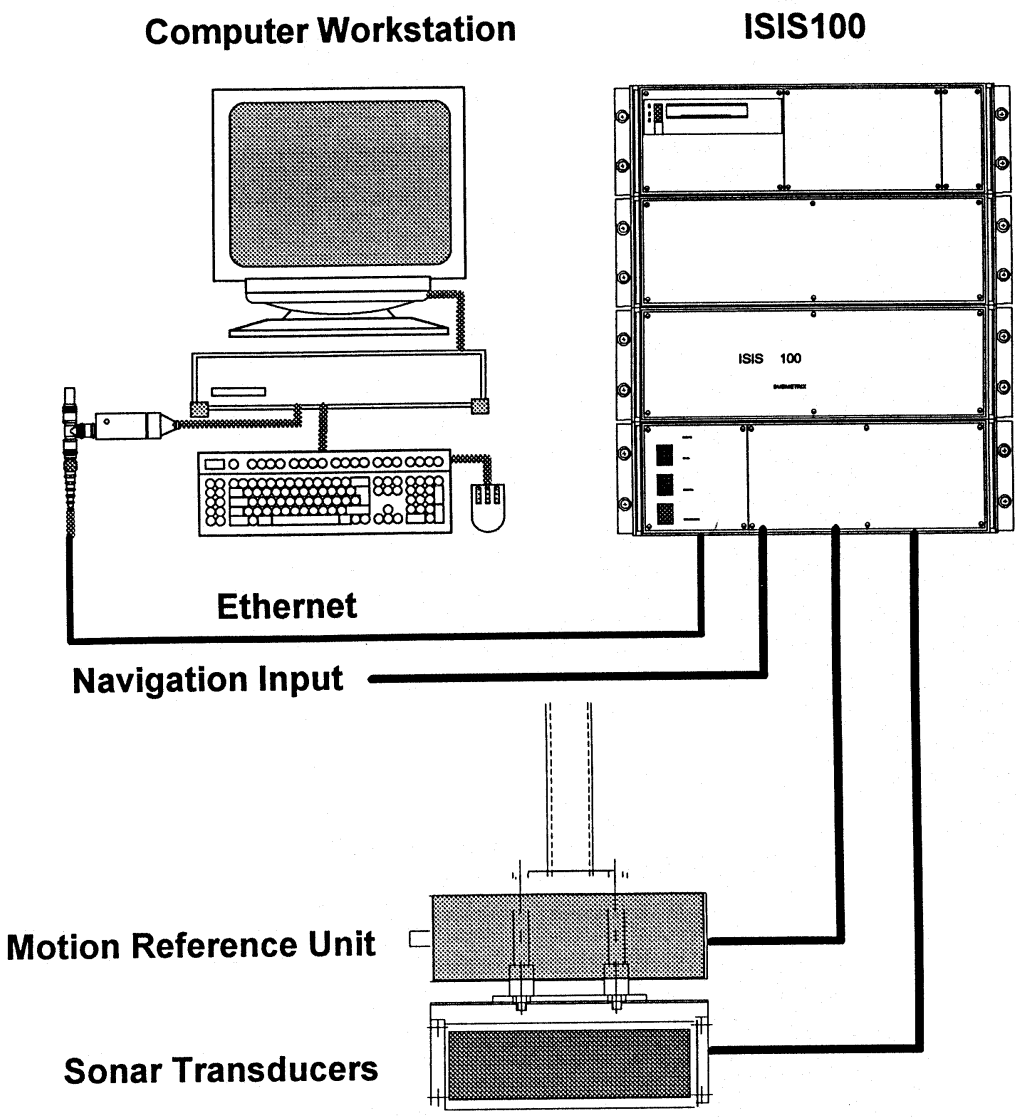
The wet end of the system is mounted in a pod, fixed to the end of a pole. The pod contains the transducers and motion reference unit. Unless the pole is very rigid, the motion reference unit should be mounted with the transducers at the end of the pole, rather than inside the vessel. The pole can be fixed to the side of a ship, or a moonpool or a gate valve. The pole can be hinged or retractable, so that the system and ship are not at risk in shallow water. This system can be used on many ships of opportunity.

Sonar performance

Operating depth	1-100 m
Max. swath width	300 m
Range v. depth	15x
Angular resolution	0.04°
Size resolution across track	7.5 cm
Accuracy	within IHO specification

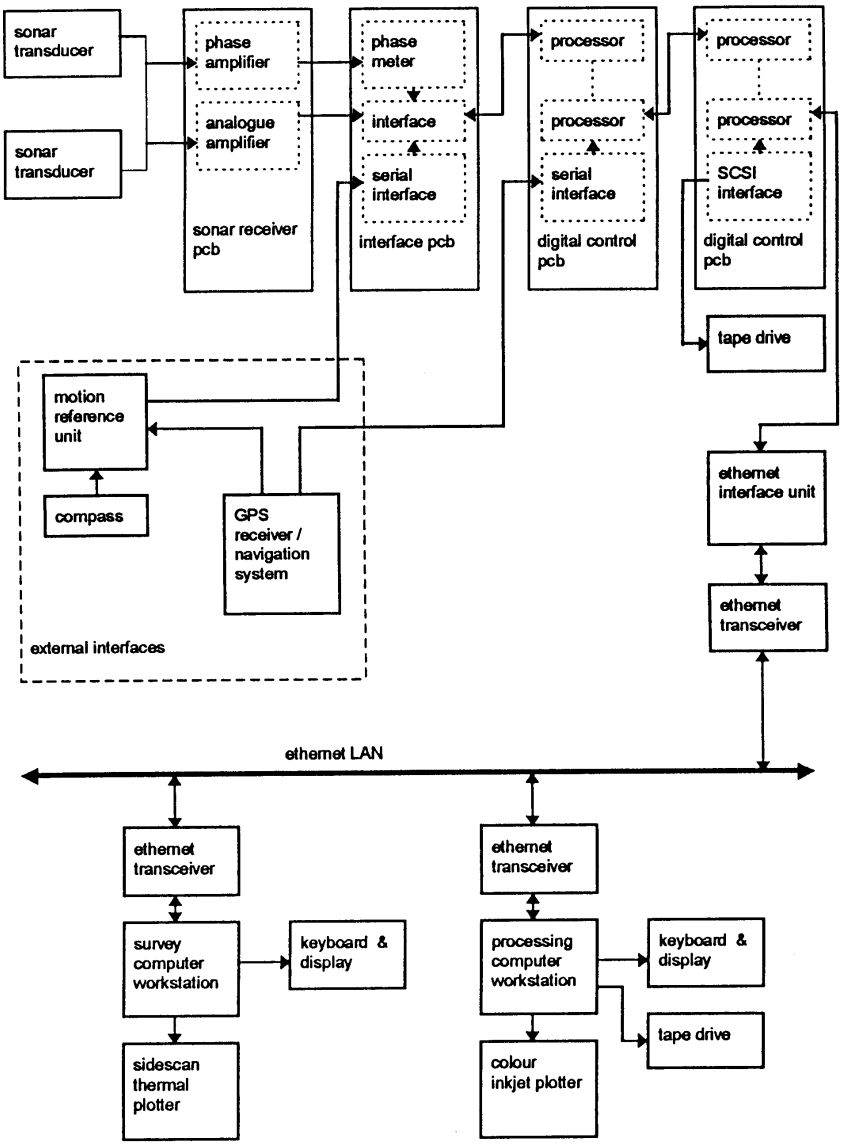
Technical description

Operating frequency	234 KHz
Beam width	1.0° azimuth, 45° elevation
Pulse repetition	10 Hz at 100m swath width 5 Hz at 300m swath width
Transmit pulse length	80 ms

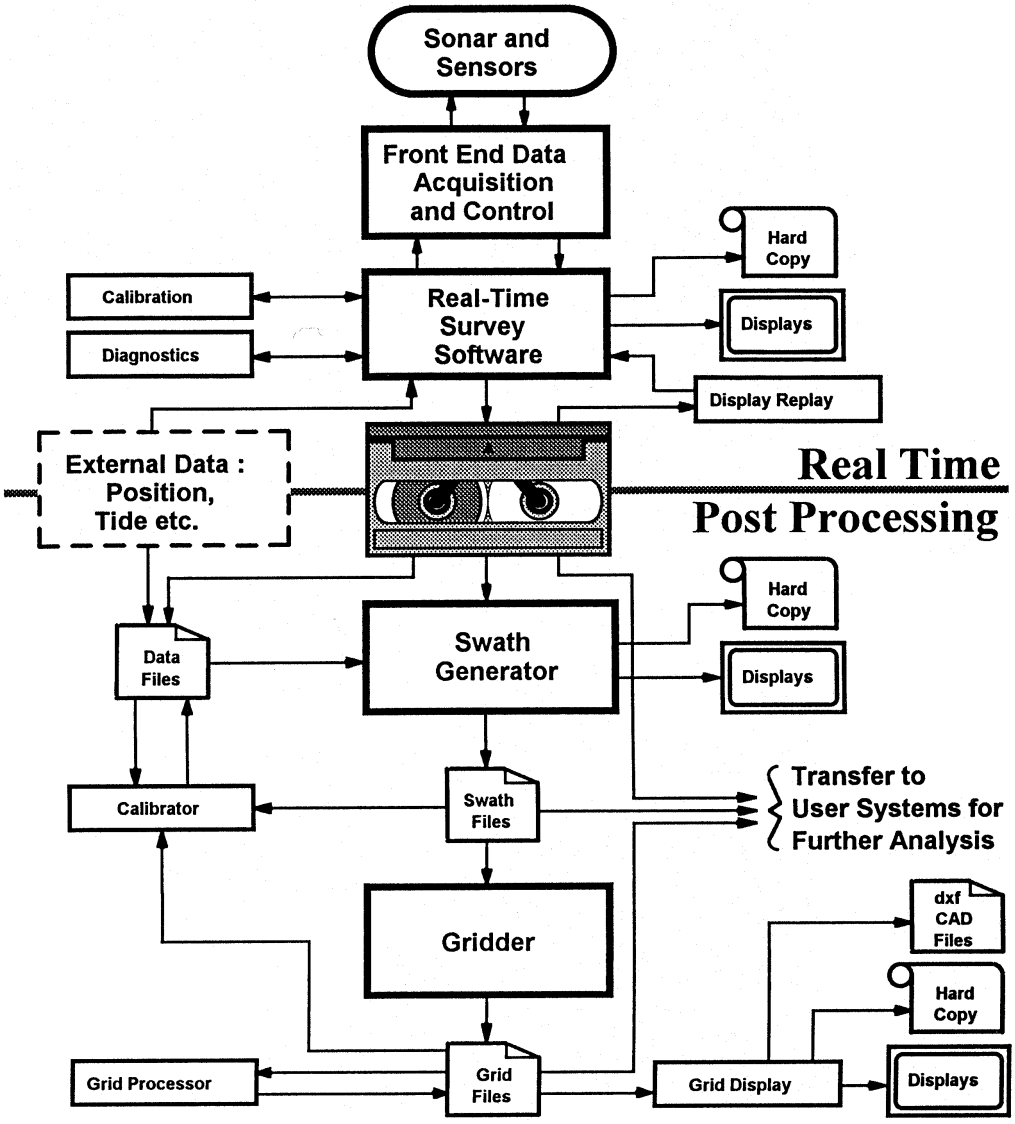


ISIS100 Hardware Block Diagram

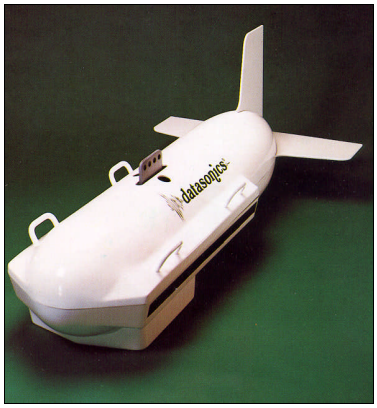
ISIS FUNCTIONAL BLOCK DIAGRAM



ISIS 100 - SOFTWARE BLOCK DIAGRAM



Datasonics SIS 1000



SIS-1000 Tow Vehicle

SIS-1000 Workstation

SIS-1000 Tow Vehicle Specifications	
Physical Characteristics	
Model	Datasonics TTV-190
Construction	Two part aluminium and fiberglass shell with tail fin assembly and steel tow point
Dimension	64” long by 18” outside diameter
Weight in air	300 lbs.
Weight in water	170 lbs.
Tether system	Industry-standard coaxial or multi-conductor cable.
Operating depth	600 meters Crush depth of the electronic pressure housing is 1,000 meters
Towing speed	Operational: 1 to 8 knots
Vehicle mains power	110-125 VAC or 220 VAC, 50/60 Hz, ±5%, 600 Watts transformed from surface power source
Power (from surface)	440 VAC, 50/60 Hz, 600 Watts

Sidescan Sonar	
Transducers	Two dual element line arrays each for port and starboard sidescan. Upper array transmits Chirp pulses; lower array receives acoustic returns.
Range	50 to 750 meters per channel
Acoustic source level	+223 dB referenced to 1 μPa @ 1 m
Transducer radiation	0.5° horizontal; 55° vertical pattern
Side-lobe suppression	-20 dB, by shading
Frequency range	Port sidescan sweeps from 90 kHz to 110 kHz Starboard sidescan sweeps from 110 kHz to 90 kHz
Sampling rate	31.250 kHz
Receiver gain	User-adjusted: 0 to 42 dB in 3 dB increments
	Time-varied: -20 to 40 dB Automatic discrete steps, relative to built-in-swath-lookup table stored in programmable memory

SIS-1000 Tow Vehicle Specifications	
Subbottom Profiler	
Transducer Arrays	Transmitter: Four Datasonics AT-471 low frequency transducers Receiver: Hydro AT473C Linear Array Hydrophone
Frequency range	Chirp pulse sweeps from 2 kHz to 7 kHz
Transducer radiation	30° conical pattern - combined transmit and receive
Sampling rate	31.250 kHz
Receiver gain	User adjusted: 0 to 42 dB in 3 dB increments
Optional Auxiliary Sensors	
Pitch and roll	Lucas AccuStar Clinometers Accuracy of 0.2° with a range of ±60°
Heading	KVH C100 Compass Accuracy: 0.5° heading variation with resolution of 0.1°
Other	Spare analog and digital channels can be used to configure customer-supplied sensors including CTD profiler, magnetometer, pressure sensor and altimeter

SIS-1000 Telemetry System Specifications	
Physical Components	
Cable	Customer-supplied, industry-standard coaxial or multi-conductor cable provides high-voltage power transmission and two-way data communications.
Data multiplexer	Datasonics Chirplink Digital Multiplexer provides frequency-division digital multiplexing.
Downlink Power Channel	
Carrier frequency	60 Hz
Allotted spectrum	0 Hz to 40 kHz
Channel contents	440 VAC, 60 Hz, 600 Watts
Downlink Control Channel	
Carrier frequency	70 kHz
Allotted spectrum	50 kHz to 90 kHz
Format	RS-232 ASCII, 9600 baud
Channel contents	Sonar control Repetition rate and transmit pulse length Port sidescan transmitter on/off Starboard sidescan transmitter on/off Subbottom sonar transmitter on/off Port sidescan channel receiver gain Starboard sidescan channel receiver gain Subbottom sonar channel receiver gain Diagnostic commands

Uplink Vehicle Status Channel	
Carrier frequency	165 kHz
Allotted spectrum	140 kHz to 190 kHz
Format	RS-232 ASCII, 9600 baud

SIS-1000 Telemetry System Specifications	
Uplink Vehicle Status Channel	
Channel contents	Vehicle heading (0-360°) Vehicle pitch +/- 90° (positive counterclockwise) Vehicle roll +/- 90° (positive counterclockwise) Echo of downlink command sent by status/control workstation Receiver gain settings Downlink command echo Uplink checksum word
Uplink Sonar Channel	
Carrier frequency	3.0 Mhz
Allotted spectrum	2.25 Mhz to 3.5 Mhz
Format	Frequency-Shift Keyed (FSK), 1.5 megabaud
Channel contents	Sidescan and subbottom sonar data

SIS-1000 Sonar Display Processor Specifications	
A Datasonics integrated workstation provides: High resolution display in user-controlled windows Digital recording of subbottom sonar output and vehicle sensor data Remote control and diagnostics of tow vehicle electronics.	
Operating system	Microsoft DOS running Microsoft Windows
Sonar display	Programmable combinations of windows displaying data from three Chirp sonar channels on a 17-inch 1280x1024 monitor, with separate window to display vehicle control information. Graphics software enhances the sonar display to a virtual resolution of 2048x2048 (16 colors)
Data recording options	Hewlett-Packard C1716T Magneto Optical (MO) drive Exabyte 8 mm cartridge drives Hard drive
Other storage	130 megabyte internal hard drive 3.5 external disk drive, high density (1.44 megabytes)
Power input	100-125 VAC or 220 VAC, 50/60 Hz, 600 Watts
Hard copy printout	Inkjet color printer and/or thermal chart recorder
User input	Trackball, extended keyboard
Physical Characteristics	
Setup	Workstation case contains processors, multiplexer and tape drive in standard 19” rack. Monitor attaches to the top of the case.
Dimensions	Case : 31.12 cm high by 50.80 cm wide by 71.12 cm deep Monitor: 35.81 cm high by 39.88 cm wide by 45.97 cm deep
Weight	Case: 34 Kg Monitor: 20 Kg

GEOPULSE UNIBOOM

POWER SUPPLY MODEL 5420A

CONTROLS

Line	Heavy duty breacker type switch to apply power to unit
Alarms Reset/Test	Momentary switch tests all alarm functions, alarm indicators, and reset alarms
Key	Momentary switch to manually key unit
HV On	Momentary switch to activate the high voltage portion of the supply
HV Off	Visible red push button to disable and discharge the high voltage

SPECIFICATIONS

Size	38.7 cm (H) $\times$ 59.7 cm (W) $\times$ 38.1 cm (D)
Weight	74.8 Kg
Line Power	115 / 230 VAC (± 10 %) - 50 / 60 Hz (± 2 Hz) - 25 Ampère surges at 115 VAC. 12.5 Ampère peak surges at 230 VAC
Output	3750 VDC, energy selectable
Key Input	(±) 3.5 to 35 Volt edge triggered from either positive or negative edge. Transformer isolated. TTL or CMOS compatible
Optic Key Input	Compatible with up to 50 meters of fiber optic cable when used with the geopule amplifier

HIGH RESOLUTION SOUND SOURCE MODEL 5810B

Source Level	227 dB re 1 μPa @ 1 m at 280 Joules
Pulse Length	< 0.2 msec
Maximum Input Energy	450 Joules
Maximum Input Voltage	4 kV
Weight	12.5 Kg
Dimensions	383 $\times$ 415 $\times$ 43 mm

GEOPULSE RECEIVER MODEL 5210A

AMPLIFIER	
Differential common mode rejection	100 dB at 60 Hz
Sensitivity	30 μV RMS in produces 1 Volt RMSout at 100 dB total gain with TVG
Signal to Noise	20 dB at 100 dB gain, 1 kHz bandwidth
Coarse Gain	40 dB maximum
Fine Gain	0 to 30 dB in 3 dB increments
FILTER	
Low Pass and High Pass	Active type, maximaly flat, 24 dB / octave minimum roll-off, 0 gain, 0.02 kHz to 15 kHz adjustable in ½ octave increments. Knobs interlock to prevent overlap
TVG	
Dymic Range	30 dB
Rate	approximately flat to 30 dB in 14 msec
Manual Delay	Vernler adjust from 1 to 14 msec with multiplier of ×1, ×10, ×100 and internal select off ×1000
AGC	
Attach	Adjustable from 330 μsec to 330 msec
Decay	Adjustable from 330 μsec to 330 msec
Range	20 dB
POWER	115 / 230 VAC ± 10 % (internal switch selectable) 47 to 63 Hz 45 Watt maximum
DIMENSIONS	48 × 43 × 19 cm 13.6 Kg

SODERA G.I. GUN

Type	Sodera G.I. Bubble Free Air Gun
Operating Pressure	Nominal: 2000 psi Maximum: 3000 psi
Operating Modes	Harmonic 90 Cubic Inch 45/45 130 Cubic Inch 75/75 210 Cubic Inch 105/105 355 Cubic Inch 105/250 True G.I. 150 Cubic Inch 45/105
Ancillaries / Options	Umbilicals Solenoid Firing Units with Injector delays Near Fields Hydrophones Digital Storage Display Units of the Near Field Pulse

Compair Reavell Compressor

Type	Compair Reavell 5436, 4 Stage Water Cooler
Duty	75 CFM at 4000 psi
Cooling	Water via integral radiator
Prime Mover	Electric Motor 45 KW, 415 V, 79 A, 50 Hz
Storage	4 off MK12 68 Litre 4000 psi Vessels Complete with condensate drains
Regulation	Hale Hamilton GLP 20 MK4
Enclosure	Offshore certified container with lifting straps and full certificates
Weight	6500 Kgs
Dimensions	2.465 m $\times$ 3.025 m $\times$ 2.570 m high
Lubricant	Anderol 500

AIR RESERVOIR

Type	Double Ended Submarine Bottle
Pressure	4000 psi
Volume	105 Litres
Enclosure	Certified Offshore Lifting Frame
Dimensions	1.780 m $\times$ 0.610 m $\times$ 0.660 m high
Weight	800 Kgs
Fittings	Stop Valve and 4000 psi Relief Valve

ITI ST-5 SOLID TOWED ARRAY

Number of receivers:	Customer specified
Number of signal pair:	Customer specified
Receiver spacing:	Customer specified
Operating bandwidth:	6Hz to 10Hz 3dB
Number of amplifiers:	1 Amplifier per element
Amplifier type:	Low noise differential w/local driven ground. 20 dB/gain
Type of sensor:	ITI PVDF “C” elements patent pending
Element capacitance:	18 nF
Element housing:	Patented low turbulence design with positive pressure gradient on all surfaces within 2 cm of the sensing element
Array type:	Solid, no oil which can be spilled in event of an accident
Array sensitivity:	-188.08db RE: 1v/µPa
Array length:	Customer specified
Lead in:	Kevlar stress member - diameter 2.73 cm-3.45 cm depending on # conductors
Output Z:	400 Ohm
Cable type:	Low density polyurethane
Element construction:	Polyurethane
Total array buoyancy:	Within 3% of neutral buoyancy
Boundary Layer Interface:	Hydrophilic polymer

Compass Bird Model 5011 - Digicourse

PHYSICAL CHARACTERISTICS	Length : 48.2 inches (1.2 m)
	Weight : 17.2 lbs (7.8 kgs) in air
	4.3 lbs (2 kgs) in sea water
	Mounting : Industry standard collars
	on 22.5" (0.57 m) centers
COMMUNICATIONS	Type : Serial FSK
	Frequency : 26 Kilohertz
	Data Rate : 2400 Bits/second
DEPTH MEASUREMENT	Operating
	Range : 0 to 400 feet (122 m)
	Resolution : ± 0.5 feet (0.15 m)
HEADING MEASUREMENT	Accuracy : ± 0.5 degrees
	Resolution : 12 bits
DIVING PLANE	Lift : 35 lbs (15.9 kgs) at 5
	knots and 15 degree wing angle
	Airfoil : NACA 651-012 Airfoil section
	Wing Span : 19 inches (48.3 cm)
BATTERY	Cells : 4 D cell Lithium
	Life : 2000 Hrs. Typical operation

Data Acquisition System DAS - 1 Oyo Geospace

DATA ACQUISITION

System type:	Oyo Geospace DAS - 1	**Equivalent input noise**	
Nr. of channels:	24, 48, 96 or 144	**- @ 2ms Sample interval:**	0.1 μVRMS @ 48 dB K-gain
Nr. auxiliary of channels:	2 - 6 (12 dB Gain)	**(500 Ohms source,125 Hz):**	0.7 μVRMS @ 24 dB K-gain
Sampling intervals:	31.25, 62.5, 125, 250 μsec	**- DC offset:**	0.1 μV @ 48 dB K-gain
	0.5, 1, 2 and 4 ms		0.15 μV @ 24 dB K-gain
Nr. of samples per trace:	48 channels - 80 K max	**Frequency responce:**	3 - 4000 Hz
	96 channels - 40 K max		
	144 channels - 27 K max		
Acquisition memory:	4 MB (expandable to 16 MB)	**Alias filter (high-cut)**	
System memory:	4 MB (expandable to 32 MB)	**- Analog:**	4.7 KHz @ 1 dB/octave
Time standard accuracy:	0.005%	**- Digital:**	4 K, 2K, 1K, 500, 125 and 62.5 Hz @ 96 dB/octave
T_B to T_O accuracy:	± 31.25 μsec	**Low cut filter**	
Delay time:	0 - 99 ms	**- Analog (default):**	3 Hz @ 6 dB/octave
Pre-trigger:	512 samples	**- Digital - freq. selectable:**	3 Hz or 20-240 Hz steps
			slope: 6 dB/octave
Preamplifier		**Digital filtering:**	Low-pass, high-pass, band-pass, multiple notch
- Input protection.	Diode/filter	**A/D Resolution**	
- Gain constants:	24, 48 dB	**- @ fc = 62.5 - 2000 Hz:**	24 bits
-Gain accuracy (chn/chn):	± 1%	**- @ fc = 4000 Hz:**	18 bits
- Input impedance		**Dynamic resolution**	
		(measured):	108 dB @ 48 dB K-Gain
- Differential:	20K/0.005 μF	**- @ fc = 3 - 125 Hz**	114 dB @ 24 dB K-Gain
- Common Mode:	5K/0.02 μF	**System dynamic range**	
		(measured):	132 dB
- Common mode		**Crossfeed isolation:**	100 dB
rejection ratio:	80 dB		
- Maximum input signal:	22 mVRMS @ 48 dB K-gain	**Total armonic distortion:**	0.005%
	350 mVRMS @ 24 dB K-gain		

PROGETTO FIUME PO
Acquisizione di dati, sperimentazione di metodologie geofisiche
e valutazione del loro impatto ambientale sul Fiume Po

DATA DISPLAY & RECORDING

Display (PC-AT compatible):	640 x 480 - EL VGA (electro-luminescent)
Mass storage (Basic Systems)	
- Floppy disk (3.5 inch):	1.44 MB
- Hard disk:	120 MB
- Recording formats:	SEG-1, SEG-2, SEG-D
Mass storage (Optional)	
-Hard disk expansion:	240/480 MB
-Tape back-up system:	120 MB
-DAT tape storage system:	2 Gigabytes
External Tape Drives:	
- 3480 Format tape cartridge	
- 1600/6250 bpi 9-track tape drive	

PERIPHERAL INTERFACE

RS-232C, Centronics, VGA Analog, Keyboard, SCSI (Optional)

PRINTERS

Internal Thermal Printer	
- Resolution:	203 dots/in (8 dots/mm)
- Plot width:	4.1 in (104 mm)
- Paper width:	4.4 in (112 mm)
- Plot speed:	1 in/sec (25 mm/sec)
External Thermal Plotter (GS-608P)	
- Resolution:	203 dots/in (8 dots/mm)
- Plot width:	8.3 in (211 mm)
- Paper width:	8.5 in (216 mm)
- Plot speed:	1 in/sec (25 mm/sec)

SYSTEM TEST

Power up diagnostic:	Functional
System diagnostic:	Board level
Performance:	Equivalent input noise
	Preamp gain accuracy
	Impulse response
	Crossfeed isolation
	Total harmonic distort.
	Geophone test

PHYSICAL

Master control unit	
- Dimension:	43.2 x 48.3 x 29.2 cm
- Weight:	25 Kg
Expansion Module	
- Dimension:	20.3 x 48.3 x 22.9 cm
- Weight:	6.8 Kg
Thermal Plotter	
- Dimension:	34.3 x 35.6 x 22.9 cm
- Weight:	10.9 Kg

ENVIRONMENTAL

Temperature	
- Operating:	0°C to 50°C
- Storage:	-40°C to 85°C
Humidity	
- Operating:	5- 95% non-condensing
- Storage/Transfer:	waterproof

POWER REQUIREMENTS

Master Controller	12 VDC
- Standby:	6 A type
- Operating:	17 Amp

Lookout SeiScope Processing System

Batch Processing Functions

- Batch flow editor allows you to create, save, recall, view, edit, and run job flows
- Batch observer's log and survey notes editor
- FK and TAU-P filter design and application
- SEG-B, D, Y, to LGC-PC1 data demultiplex
- Most floppy disk based formats to LGC-PC1 data reformat
- Kills trace and shot
- Spike, adaptive, and predictive deconvolution
- Band-pass and band-reject filter
- Adaptive and median filters
- Front, surgical, and tail mute
- AGC, geospreading, and trace equalisation gains
- CDP and shot NMO correction
- Trace data window
- Trace array forming
- Elevation datum statics
- Trace header update
- Trace append
- Vertical stack
- Horizontal stack
- Vibroseis correlation
- Plot to BMP file
- LGC-PC1 to SEG-Y data reformat (floppy disk and tape output)

CDP Functions **Processing**

- Sort by CDP number and then shot-receiver offsets
- Sort by any pair of trace header entries
- Sum CDP gathers into stacked traces
- Sum gathers based on any common header entry
- Constant velocity stack panels plus velocity spectra
- General processing (gain/NMO/mute)
- Surface consistent automatic statics
- Correlation-based trim statics
- Statics quality control
- Trace header quality control
- Trace migration
- Interactive trace editing
- Interactive trace spectra
- Interactive trace and shot mute
- Interactive velocity analysis
- Interactive minimum and zero phase
- Interactive TVF filters

The Lookout SeiScope Processing System is implemented by the Tape Copy Package which has the following main features:

Tape Copy features

- Operates with single or dual 9-tracks drives
- SCSI support for 3480 cartridges, 8 mm Exabyte, 4 mm DAT and DLT tapes
- Supports multiple output copies of input data
- Upwardly compatible with other Lookout software

Tape Copy functions

- Format identification for popular SEG formats
- Copies multiplexed or demultiplexed data

Lookout 9-track Controller

- Interfaces to Pertec format 9-track drives
- Supports large multiplexedbdata blocks

Tape I/O and sea test

III MEZZI NAVALI

Nelle pagine seguenti sono riportate le specifiche dei mezzi navali utilizzati per i rilievi batimorfologico e sismico multicanale.
I mezzi navali utilizzati sono:

- Survey Vessel “Maria Adelaide” (rilievo batimorfologico)
- Pontone “Silvia” (rilievo sismico multicanale)

SURVEY VESSEL “MARIA ADELAIDE”

NOME:	MARIA ADELAIDE
MATRICOLA:	RA3766
BANDIERA:	Italiana
LUNGHEZZA:	12 mt
LARGHEZZA:	4 mt
PESCAGGIO:	0.8 mt
MOTORI:	2 × 150 CV
GENERATORI:	due: 4 KW 220V monofase stabilizzato 7 KW 380V trifase
PERSONALE TRASPORTABILE:	max 7 tecnici
ABILITAZIONE:	Servizi speciali e rilievi geofisici
STRUMENTAZIONE DI BORDO:	pilota automatico radar VHF ecoscandaglio frame con verricello, portata max 800 Kg

PONTONE “SILVIA”

NOME:	PONTONE SILVIA
LUNGHEZZA:	20 mt
LARGHEZZA:	8 mt
PESCAGGIO:	1.50 - 1.70 mt
MOTORI:	1 FIAT 300 cavalli
PERSONALE	comandante, motorista, marinaio
STRUMENTAZIONE DI BORDO:	radar
PORTATA:	700/800 quintali

IV TABELLE VIBROMETRICHE

Nelle pagine seguenti sono allegati tredici “printout” relativi ad alcuni dei “files” acquisiti durante le misure vibrometriche per valutare l’impatto dell’*air gun* sugli argini del F. Po.