

Sub-bottom Profiling Equipment

It is likely that you will find sub-bottom profiling equipment onboard most of the survey vessels involved in offshore investigations. Whereas the echo sounder is designed for top-layer investigations, with high-resolution and seismic equipment for deep penetration, sub-bottom profiling equipment covers the area in between and provides a glance into the first ten to hundreds of metres of the sea bottom. On top of this, the sub-bottom profiler is a thankful piece of equipment when it comes to enjoying onboard discussions between hydrographer and geophysicist regarding required penetration, frequency used versus data resolution, definition of the top of the seabed and features found.

Although the principles of these analogue systems have not changed, we see further development towards refined design and specialised technology, whether in single-frequency or in chirp systems. A great number of these instruments provide data results in digital format. Data analysis and processing techniques give the opportunity to introduce bottom classification. Together with specialised geotechnical investigations, we leave the sea-bottom with fewer secrets every time these instruments are used out on the sea. The present survey covers types of systems, each developed for their own specific purpose(s) and needs. Whether you need to know about the top of the seabed for accurate measurement of silt-layer thickness, or the location of boulders and bedrock, or if you are more interested in finding shallow gas in the deeper sea-bottom layers - you will find the right tool in this product survey. Hydro INTERNATIONAL would like to thank all manufacturers who contributed to this Product Survey and responded to the questions about their products. ■

Company	Applied Acoustics	Applied Acoustics
Name of Product	CSP-L Inshore Boomer	CSP300P Boomer System
Year of initial development	2004	1996
General Specifications		
Type of System (Profiler, Sub-bottom profiler, boomer, sparker, other)	Hi resolution Boomer	Industry Standard Boomer
Surface		
Weight in Air of surface equipment (excl. Winch) [kg]	16	35
Size H/W/L [cm]	17 x 48 x 30	17 x 48 x 50
power supply [Volts DC/AC]	100 - 250 VAC	115/230 VAC
Sub - Surface		
Weight in Air of sub-surface equipment [kg]	32	35
Size H/W/L [cm]	50x73x93	45x90x125
Power Supply [volts DC]	Powered from Surface	Powered from surface
Depth rating - standard / optional [mtrs]	Surface tow	Surface tow
Integrated with		
Stand-Alone	Stand Alone System	Stand Alone System
Sidescan Sonar		
Single-beam Echo Sounder		
Depth Sensor		
Multi-beam Echosounder		
Magnetometer		
Other		
Towing platform		
Hull mounted		
Over-the-side mounted		
Surface Tow	Catamaran	Catamaran
Fish-mounted		
ROV / AUV mounted		
Other		
What type of towing cable is used	Integrated with power cable	Integrated with power cable
Maximum length of towing cable [mtrs]		
	100	100
Frequencies		
Is this a 'Chirp' system	N	N
In What size steps can the frequency be adjusted [kHz]		
Frequencies (For Chirp system specify the Frequency Range)		
Frequency [kHz]	800 Hz - 10 kHz	600 Hz - 6 kHz
Frequency [kHz]		
Frequency [kHz]		
Max Firing /Repetition Rate [Pulses/sec]	10 Hz	6 Hz
Pulse length max&min [msec]	0.15 to 0.12 mS	0.25 to 0.15 mS
Type of energy source		
Electromagnetic Transducer	Boomer Plate	Boomer Plate
Sparker		
Other		
Maximum Power Output [kjoules]	100 J (0.1 kj)	350 J (0.35 kj)
If applicable, Transducer Beam width	"±/- 30 degrees receiver"	
If applicable, Number of transducers supported		
Signal is received by type		
Transmitting Transducer		
Hydrophone	Single Element Hydrophone	
Mini Streamer		Multi Element Streamer
Accuracies		
Maximum achievable resolution [cm]	9	15
Maximum achievable penetration [mtrs]	12	30 typical
What soil type was this achieved in	Sand	Sand
Data Storage and Output		
Hard Copy Printer Supported (None, EPC, Ultra, Geoprinter, Other)	EPC/ULTRA	EPC/ULTRA
Digital Recorders Supported (None, CODA, Triton Elics, Other)	CODA + Others	CODA + others
Digital Data Formats Supported (None, SEG-Y, QMIPS, CODA, XTF, Other)	Depends on digital recorder used	As left
What is the typical application for your system? (max 30 words)	High resolution inshore surveys with penetration close to that of a standard boomer. Typical applications are river and estuary surveys, pipeline crossings and marine archaeology. Particularly useful for small vessel applications	An industry standard Boomer; used for general seabed surveys where a good mixture of penetration and resolution is required
Additional Comments		

N/A Not Applicable
 No information received



Applied Acoustics	C-Products Ltd	C-Products Ltd	C-Products Ltd
CSP2200 Sparker System 200A0	C-Boom Low Voltage Boomer 1991	C-Phone Mini Hydrophone 1988	C-View Seis 2003
Sparker	Boomer	Hydrophone Receiver	Sub-sea Logging, Processing and Reporting software
54	Surface power supply 18	Surface receiver 0.34	2.9
31 x 48 x 60 115/230 VAC	18 x 43 x 43 110 & 240 Vac	5.2 x 9 x 17.2 24v DC	3.6 x 36.4 x 26.4 110-240 Vac
40	Sub-Surface sled and electronics module 30	Sub-Surface streamer 1	N/A
50x90x125 Typ 3000 - 4000 VDC Surface tow	37x103x95 400 to 600V user adjustable 5	180x2.6 (diameter) 24v DC 5	N/A N/A N/A
Stand Alone System	Stand alone N/A N/A N/A N/A N/A N/A	Stand alone N/A N/A N/A N/A N/A N/A	All Sub-Bottom sources and receivers All Analogue SSS + Klein 3000 All with RS232 data exchange All with RS232 data exchange L3 + Simrad : processing + reporting All with RS232 data exchange All others with RS232 data exchange
Catamaran	N/A N/A Surface Tow N/A N/A N/A	N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
Integrated with power cable	Lightweight combined power and tow cable. Triple insulated, double screened, kevlar reinforced. Neutrally buoyant. Weight in air 0.22Kg/m 1.4cm diameter	Lightweight combined signal and tow cable. Triple insulated, double screened, kevlar reinforced. Weight in air 0.11Kg/m 1.2cm diameter	N/A
100	150	150	N/A
N	N N/A	N N/A	N N/A
200 Hz - 3 kHz	2060Hz 1478Hz Center Frequency 1760Hz	N/A N/A N/A	N/A N/A N/A
6 Hz	8 per sec 125mS	N/A	N/A
3mS to 0.3 mS	0.676mS 0.485mS	N/A	N/A
Multi Electrode Sparker	Y N/A N/A	N/A N/A N/A	N/A N/A N/A
2.2 kJ	100joule per pulse Not established One	N/A Not established One	N/A N/A N/A
Multi Element Streamer	N/A Hydrophone Mini Streamer	N/A N/A N/A	N/A N/A N/A
20 500	20 >60m penetration in 120m water depth. NW Australia	Source dependent N/A	N/A N/A
Unknown	Calcareous Sand interlayered with weak Calcareonites	N/A	N/A
EPC/ULTRA	Source only. Requires receiver and logging system	2 x isolated analogue outputs	Analogue recorders, Bubble jet printer, EPC digital, Ultra digital
CODA + Others	Source only. Requires receiver and logging system	Requires logging system with analogue input	C-View is the recorder
As left	Source only. Requires receiver and logging system	Requires logging system with analogue input	C-View CVD, Seg-Y, XTF
Typically used for marine geological surveys where deep penetration is required	C-Boom is a safe portable cost effective alternative to traditional higher voltage boomers, operating from offshore depths to 1m of water in small craft where conventional systems could not perform	C-Phone was developed to be simple and cost effective on very small survey craft operating in awkward shallow conditions. It is equally effective in a deep open water environment	C-View enables cost effective logging, processing, charting and reporting of sub-sea data, including sub-bottom profilers. C-View Seis is the laptop single channel version of the multi channel C-View software suite



Product Survey

Company	EdgeTech	EdgeTech	EdgeTech	General Acoustics GmbH
Name of Product	2200-M Modular Sonar System	3100P Portable Sub-Bottom Profiling System	3200-XS Sub-Bottom Profiling System	DSLPL Subbottom Profiler
Year of initial development	1997	2005	1993; 3 modifications since	2005
General Specifications				
Type of System (Profiler, Sub-bottom profiler, boomer, sparker, other)	Sub-Bottom Profiler for AUV/ ROV	Sub-Bottom Profiler	Sub-Bottom Profiler	Subbottom Profiler
Surface				
Weight in Air of surface equipment (excl. Winch) [kg]		14		41
Size H/W/L [cm]		18H x 38W x 50L cm		63 x 53 x 29 cm
power supply [Volts DC/AC]	DW-106/DW-216/DW-424		110/220 VAC	110 VAC / 230 VAC
Sub - Surface	39/16/8	Standard SB-216S Tow Vehicle	Standard SB-0512i Towfish	
Weight in Air of sub-surface equipment [kg]	48	76	190 kg	35 Kg
Size H/W/L [cm]	6000	40 x 67 x 105	47 x 124 x 160	Ø 37 cm , 17 high
Power Supply [volts DC]			N/A	
Depth rating - standard / optional [mtrs]	Y	300	300	500
Integrated with	Optional			
Stand-Alone		X	Standard	Y
Sidescan Sonar	Optional			
Single-beam Echo Sounder	Optional			Y
Depth Sensor	Optional		Optional	
Multi-beam Echosounder	Interface to any Serial sensor			
Magnetometer				
Other				
Towing platform				
Hull mounted			Optional	Y
Over-the-side mounted		Optional	Optional	Y
Surface Tow	X			
Fish-mounted		Standard	Standard	
ROV / AUV mounted				
Other				
What type of towing cable is used		Multi-conductor Kevlar reinforced	Multi-conductor Kevlar reinforced	
Maximum length of towing cable [mtrs]	Y	300	500	
Frequencies	0.1			
Is this a 'Chirp' system		Y	Y	N
In What size steps can the frequency be adjusted [kHz]	1-6/2-16/4-24	0.1	0.1	
Frequencies (For Chirp system specify the Frequency Range)				
Frequency [kHz]		2-16 kHz	0.5 - 12 kHz	12 KHz
Frequency [kHz]	15			
Frequency [kHz]	100/5			
Max Firing /Repetition Rate [Pulses/sec]		15	15	20 Hz
Pulse length max&min [msec]		100/5	100/5	100 µs - 1 ms
Type of energy source				
Electromagnetic Transducer	Piston Transducer			
Sparker	80			
Other	30/20/15		Piston Transducer	Piezo Electric
Maximum Power Output [kJoules]	4	20	200	5000 W
If applicable, Transducer Beam width		20	25	10°
If applicable, Number of transducers supported		1	2	1
Signal is received by type	2			
Transmitting Transducer				Y
Hydrophone		2	4	
Mini Streamer	15/6/4			
Accuracies	200/80/40			
Maximum achievable resolution [cm]	Clay			0.1 cm
Maximum achievable penetration [mtrs]		6/80	20/200	10 m
What soil type was this achieved in	All Thermal Printers	coarse calcareous sand/clay	coarse calcareous sand/clay	Sand
Data Storage and Output	EdgeTech & others			
Hard Copy Printer Supported (None, EPC, Ultra, Geoprinter, Other)	SEG-Y, JSF	All Thermal Printers	All Thermal Printers	Windows printer
Digital Recorders Supported (None, CODA, Triton Elics, Other)	Search & Recovery, Archeological, Route, Burried pipe line, Geological, Geo-Hazard surveys	EdgeTech & others	EdgeTech & others	
Digital Data Formats Supported (None, SEG-Y, QMIPS, CODA, XTF, Other)		SEG-Y, JSF	SEG-Y, JSF	xyz; SEG-Y
What is the typical application for your system? (max 30 words)		1)	1)	2)
Additional Comments		Optional SB-424 Tow Vehicle available, contact company for specifications	Optional SB-216S Towfish and SB-224 Towfish available. Contact company for specifications	



GeoAcoustics	GeoAcoustics	GeoAcoustics	Geo-Resources
GeoPulse Profiler	GeoChirp 2	GeoChirp 3-D	Geo-Spark 1 / 1,5 / 2 kJ Spread
1980	2000	2005	2000
Pinger	Chirp profiler	3-D volume imaging chirp profiler	200-tip Sparker + Power Supply
30	12	24	Sparker 75, Power Supply 75, Cable 75
31, 43, 50 100--240 AC	31, 43, 50 100--240 AC	43,49,28 100--240 AC	220 V / AC
Towfish = 125kg	Towfish = 150kg	Rigid hydrophone array = 176kg	
50, 50, 156 N/A 600/2000/3000	50, 50, 156 N/A 600/2000/3000	50, 250, 200 N/A surface	
Y	Y	Y	
Y	Y		
	Y		Geo-Trace recording / processing system
Y	Y		
Y	Y	Y	Surface towed Sparker
Y	Y		
Y	Y		
Armoured	Co-axial	Rope	HV power / tow cable
1000	100 Longer options can be configured	30	50 / 100
N	Y	Y	N
variable between 2-12 kHz = optional 14kHz	0.001	fully programmable chirp	
	2kHz-7kHz 1.3kHz - 11.5 kHz Customer specified	1.5kHz - 13kHz Fully programmable pulse shape Customer specified	Centre Frequency 750 - 1500 Hz
10 internal. Key rate dependent external	8 pps	8 pps	2x / sec at 1 kJ
	typical 32ms, programmable	typical 32ms, programmable	0.5 - 1.5 msec
Y	Y	Y	
			Sparker Solid State Pulsed Power Supply 1 kJ / 1,5 kJ / 2 kJ
10kW Variable across frequency range 1/2/4/9/16/or more	5kw/10kw Variable across frequency range 1/2/4/9/16/or more	4kW Variable across frequency range Typically 4 (variable configuration)	
Y	Y / optional		
	Y / optional	multi-element rigid array (60+ channels), simultaneously sampled receivers	
	Y / optional		6)
10 50	6 100	10 - 20 (3-D imaging) 50	25 cm 500 m
Various	Various	Various	Soft sediments
All	All		OYO, EPC, Printrex
All	All		The analogue signal from the Geo-Sense mini streamer can be recorded by all recorders
Ananlogue signal	Analogue signal	SEG-Y	
3)	4)	5)	Site and route surveys, offshore engineering, mineral exploration, oceanographic research



Product Survey

Company	Geo-Resources	Geo-Resources	INNOMAR Techn. GmbH	INNOMAR Techn. GmbH
Name of Product	Geo-Spark 6 & 16 kJ Spread	Geo-Spark 1 kJ sub-tow spread	SES-2000 compact	SES-2000 standard
Year of initial development	2001	2002	2002	2001
General Specifications	800-tip / 1600 Sparker + Power Supply	200-tip Sub-Tow Sparker + Power Supply		
Type of System (Profiler, Sub-bottom profiler, boomer, sparker, other)			Parametric Sub-Bottom-Profiler	Parametric Sub-Bottom-Profiler
Surface	Sparker 150 / 300 kg, Power Supply 300 / 500 kg, Cable 125 / 250 kg (ex winch)	Power Supply 75 kg, Cable 150 kg (ex winch)		
Weight in Air of surface equipment (excl. Winch) [kg]			23	49
Size H/W/L [cm]	220 V & 380 V / AC	220 V / AC	(0.30 x 0.35 x 0.40) m ³	(0.52 x 0.44 x 0.40) m ³
power supply [Volts DC/AC]			115-230V AC +5%/-10%, 50-60Hz	115-230V AC +5%/-10%, 50-60Hz
Sub - Surface		75 kg		
Weight in Air of sub-surface equipment [kg]		1,0x0,75x0,5 m	25kg (incl. 20m cable)	30kg (incl 30m cable)
Size H/W/L [cm]		Towing depth 30 m below surface	(0.07 x 0.26 x 0.30) m ³	(0.07 x 0.26 x 0.30) m ³
Power Supply [volts DC]			n. a.	n. a.
Depth rating - standard / optional [mtrs]			1 m - 400 m	1 m - 500 m
Integrated with				
Stand-Alone			x	x
Sidescan Sonar			Option	Option
Single-beam Echo Sounder			x	x
Depth Sensor				
Multi-beam Echosounder				
Magnetometer	Geo-Trace recording / processing system	Geo-Trace recording / processing system		
Other				
Towing platform				
Hull mounted			x	x
Over-the-side mounted			x	x
Surface Tow	Surface towed Sparker			
Fish-mounted				
ROV / AUV mounted		Sub-Tow Sparker	Option	Option
Other	HV power / tow cable	HV power / tow cable		Moon pool
What type of towing cable is used	50 m / 100 m	50 m / 100 m	multi-conductor cable	multi-conductor cable
Maximum length of towing cable [mtrs]			20m	40m
Frequencies	N	N		
Is this a 'Chirp' system			N	Option: Chirp mode
In What size steps can the frequency be adjusted [kHz]			5, 6, 8, 10, 12, 15kHz	4, 5, 6, 8, 10, 12, 15kHz
Frequencies (For Chirp system specify the Frequency Range)	Centre Frequency 750 - 1500 Hz	Centre Frequency 1000 - 2500 Hz		
Frequency [kHz]				Chirp Mode: 5 ... 15kHz
Frequency [kHz]	1x / 2 sec @ 6 kJ - 1x / 4 sec @ 16 kJ	2x / sec @ 1 kJ		
Frequency [kHz]	0.5 - 1.5 msec	0.4 msec		
Max Firing /Repetition Rate [Pulses/sec]			30	50
Pulse length max&min [msec]			min: 0.067msec, max: 0.5msec	min: 0.067msec, max: 0.8msec
Type of energy source	Sparker	Sub-Tow Sparker		
Electromagnetic Transducer	Solid State Pulsed Power Supply	Solid State Pulsed Power Supply		
Sparker	6 & 16 kJ	1 kJ		
Other			x	x
Maximum Power Output [kJoules]			12kW	20kW
If applicable, Transducer Beam width			3.6°	3.6°
If applicable, Number of transducers supported			1	1
Signal is received by type				
Transmitting Transducer	Geo-Sense mini streamer (8 - 48 elements) and Geo-Trace 2 Dual channel recording system	Geo-Sense mini streamer (8 - 48 elements) and Geo-Trace 2 Dual channel recording system	x	x
Hydrophone				
Mini Streamer	25 cm	< 20 cm		
Accuracies	750 m	300 m		
Maximum achievable resolution [cm]	soft sediments	soft sediments	5cm	5cm
Maximum achievable penetration [mtrs]			40m	50m
What soil type was this achieved in	OYO, EPC, Printrex	OYO, EPC, Printrex	Clay	Clay
Data Storage and Output	The analogue signal from the Geo-Sense mini streamer can be recorded by all recorders	The analogue signal from the Geo-Sense mini streamer can be recorded by all recorders		
Hard Copy Printer Supported (None, EPC, Ultra, Geoprinter, Other)			EPC, Ultra, HP	EPC, Ultra, HP
Digital Recorders Supported (None, CODA, Triton Elics, Other)	Site and route surveys, offshore engineering, mineral exploration, oceanographic research	Site and route surveys, offshore engineering, mineral exploration, oceanographic research	Analogue and trigger output for any third-party recorder	Analogue and trigger output for any third-party recorder
Digital Data Formats Supported (None, SEG-Y, QMIPS, CODA, XTF, Other)			SEG-Y, CODA, XTF and Others	SEG-Y, CODA, XTF and Others
What is the typical application for your system? (max 30 words)			7)	8)
Additional Comments				

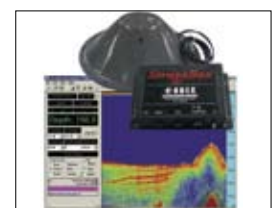


INNOMAR Technologie GmbH	Meridata Finland Ltd	SEABED BV	S.I.G.
SES-2000 deep 2006	MD DSS 1999	3010 Multi Purpose Transceiver 1994	Mille 2000
Parametric Sub-Bottom-Profiler	Sub-bottom profiler	Sub-bottom profiler	sparker
115kg	20	15	70
2 units of (0.52 x 0.44 x 0.40) m ³ 115-230V AC +5%/-10%, 50-60Hz	44/53/71 230 V AC	24 / 55 / 48 110VAC - 220 VAC	60x50x38 230 VAC
204kg	20	60	
(0.15 x 0.80 x 0.75) m ³	32/30/70	80/60/60 [cm]	
n .A. 5 m - 6000 m	from surface 100 / 600	N/A 50 / 1000	
x Option	Y Optional	Standard Optional	
x	Optional	Optional	
	Optional	Optional	x
	N	N/A	
	Optional	N/A	
x (or moon pool)	Standard Optional Optional Optional Optional	3060 S 3050 S/P N/A 3040 S/P N/A N/A	
Moon pool multi-conductor cable 40m	Depends on the number and type of sensors Depends on the number and type of sensors	Armoured towcable 3 km	HV cable 100
Option: Chirp Mode 2, 3, 4, 5, 6, 7kHz	Y 0.001	N N/A	N
Chirp Mode: 2 7 kHz	0.5 – 40 kHz (user defined within the limits of transducer type)	3 - 3,5 - 4 - 5 - 7 kHz 10 - 12 - 14 kHz	Centered I
		200 kHz	
30	10	32	1 PPS
min: 0.25msec, max: 3.7msec	0 – 500	0,1 - 2	0.7
			x
x 80kW 3.0° 1 array of 3 sections	Piezoelectric transducer Depends on the transducer type 28	Pre-stressed Piston Element 10) 15° - 120° depending computer configuration 16 - 9 - 8 - 4 - 2 (3,5 - 7 kHz) 1 (10 - 14 kHz)	I
x	Optional	x	
	Y Optional		x
15cm 150m	3 (range), 6 (layer) 20 to 60	3,5 kHz = 20cm 14 kHz = 5cm 15 - 20 mtr	150 400
Clay	Marine sediments	silt - clay	consolidated sed
EPC, Ultra, HP	EPC	Y, with analogue input	All
Analogue and trigger output for any third-party recorder	Meridata	Y, with analogue input	All
SEG-Y, CODA, XTF and Others	Meridata, SEG-Y	N/A	
9)	Geological and geophysical survey	Geotechnical survey & Pipe allocating	Oceanographic research, mineral exploration, engineering



Product Survey

Company	S.I.G.	S.I.G.	S.I.G.	SyQwest, Inc.
Name of Product	2mille	Energos200	Energos300	Stratabox Geophysical Instrument
Year of initial development	2002	2001	2000	2003
General Specifications				
Type of System (Profiler, Sub-bottom profiler, boomer, sparker, other)	sparker	sparker	boomer	Sub- Bottom Profiler
Surface				
Weight in Air of surface equipment (excl. Winch) [kg]	74	48	48	.9 (kg)
Size H/W/L [cm]	70x50x45	50x40x30	50x40x30	6.22cm x 25.27cm x 21.76cm
power supply [Volts DC/AC]	230 VAC	230 VAC	230 VAC	12-30 VDC
Sub - Surface				
Weight in Air of sub-surface equipment [kg]				16.78 (kg)
Size H/W/L [cm]				25cm/48cm
Power Supply [volts DC]				n/a
Depth rating - standard / optional [mtrs]				standard transducer 25 meters (optional transducer 6500 meters)
Integrated with				
Stand-Alone				Y
Sidescan Sonar				N
Single-beam Echo Sounder				N
Depth Sensor	x			N
Multi-beam Echosounder				N
Magnetometer				N
Other	Streamer	Streamer	Streamer	N
Towing platform				
Hull mounted				Y, optional
Over-the-side mounted				Y
Surface Tow	x	x	x	N, optional
Fish-mounted				N, optional
ROV / AUV mounted				Y, optional
Other				
What type of towing cable is used	HV cable	HV cable	HV cable	N/A
Maximum length of towing cable [mtrs]	100	75	75	
Frequencies				
Is this a 'Chirp' system	N	N	N	N
In What size steps can the frequency be adjusted [kHz]				10kHz or 3.5kHz configured at the time of order
Frequencies (For Chirp system specify the Frequency Range)				
Frequency [kHz]	Centered 1	Centered 1,2	0.3	N/A
Frequency [kHz]			3	N/A
Frequency [kHz]				N/A
Max Firing /Repetition Rate [Pulses/sec]	2sec	4 pps	2 pps	10 pulses/ second
Pulse length max&min [msec]	0.8	0.8	0.25	.1 to .8 ms
Type of energy source				
Electromagnetic Transducer				N/A
Sparker	x	x	x	N/A
Other				11)
Maximum Power Output [kJoules]	2	0.25	0.3	300 Watts, 1000 Watts capable
If applicable, Transducer Beam width				40 degree
If applicable, Number of transducers supported				1, 2, or 4
Signal is received by type				
Transmitting Transducer				Y
Hydrophone				
Mini Streamer	x	x	x	
Accuracies				
Maximum achievable resolution [cm]		90	20	6 cm
Maximum achievable penetration [mtrs]	1000	120	50	12)
What soil type was this achieved in	consolidated sed	Sed + volcanics	Sed	12)
Data Storage and Output				
Hard Copy Printer Supported (None, EPC, Ultra, Geoprinter, Other)	All	All	All	13)
Digital Recorders Supported (None, CODA, Triton Elics, Other)	All	All	All	
Digital Data Formats Supported (None, SEG-Y, QMIPS, CODA, XTF, Other)				SEG-Y and ODC
What is the typical application for your system? (max 30 words)		Near shore investigations	Near shore investigations	14)
Additional Comments				



SyQwest, Inc. Bathy 2010	SyQwest, Inc. Bathy 2010P
2005	2006
CHIRP Deep Water Bathymetry and Sub Bottom Profiler	Portable CHIRP Bathymetry and Sub Bottom Profiler
170 lbs (77 approx. kg)	64 lbs (30 kg approx.)
Standard 19" rack Height 1244.6 mm (49 inches) Depth 762 mm (30 inches) 110 / 220*V 50/60 Hz 600 Watts	9.75 in (24.8 cm) H x 17 in (48.2 cm) W x 29.5 in (75 cm) D 110 / 220*V 50/60 Hz 300 Watts
100 (kg) dependant on the specific transducer and frequency selected	100 (kg) dependant on the specific transducer and frequency selected
N/A	N/A
Y	Y
N	N
N	N
N	N
N	N
N	N
N	N
Y	Y
Y	Y
Y	Y
Y	Y
N	N
Y	Y
1, 2 and 4kHz bandwidth	1, 2 and 4kHz bandwidth
3.5 kHz (2 to 7kHz sweep) 12 kHz (10 to 14kHz sweep)	3.5 kHz (2 to 7kHz sweep) 12 kHz (10 to 14kHz sweep)
4 per second	4 per second
.1 to 50 ms	.1 to 50 ms
n/a	n/a
n/a	n/a
15)	15)
5 kilowatts or 10 kilowatts	2 kilowatts, (optional 5 or 10 kilowatts)
18 degree to 50 degrees transducer array dependant	18 degree to 50 degrees transducer array dependant
1, 2, 4, 9, 12, 16	1, 2, 4, 9, 12, 16
Y	Y
8cm up to 200 meters	8cm up to 200 meters
layered silts and sand	layered silts and sand
SyQwest, Inc.'s TDU-850, TDU-1200/F and TDU-2000F Thermal Printers	SyQwest, Inc.'s TDU-850, TDU-1200/F and TDU-2000F Thermal Printers
SEG-Y Raw and Processed data formats	SEG-Y Raw and Processed data formats
16)	17)

Notes

- 1) Search & Recovery, Archeological, Route, Buried pipe line, Geological, Geo-Hazard surveys
- 2) • High Resolution Subsoil Exploration
• Shallow Water Surveying up to 1.5 m • Object Detection
• Pipeline Tracking
• Dredge and Dump Monitoring
• Archaeological Surveying
• Volume Determination
• Sand Reclamation
- 3) Industry standard general purpose profiling tool in use worldwide on survey, construction, aggregate investigation archaeological and scientific projects. Versatile and robust. New Pipeliner configuration available
- 4) Very high resolution profiling in shallow waters or also in deeper waters when incorporated into the DT2000 system. Utilised for general survey applications where highly repeatable accurate results are required
- 5) Very high resolution (decimetric) true 3D sub-bottom data volumes, from the first 10s of meters of the seabed. 3-D volumes generated by coherent migration of chirp data from multiple pings
- 6) Geo-Sense mini streamer (8 - 48 elements) and Geo-Trace 2 Dual channel recording system
- 7) usable at very small boats, geological and geophysical explorations, surveys in small and shallow waters, environmental investigations, search for mineral resources (sand, gravel)
- 8) geological and geophysical explorations, investigation of buried pipes and objects, route surveys, environmental investigations, search for mineral resources, investigation of building sites, bridges, tunnels, wind parks
- 9) geological and geophysical offshore explorations in the deep sea, environmental investigations, climate research, search for mineral resources, investigation of building sites, route surveys
- 10) Power Output: 10 kW pulse power RMS, 1% duty cycle max. at 50 ohms load. Adjustable 0-10 kW continuously
- 11) flooded ring and cone transducer (optional TR-109 Array for 3.5kHz operation)
- 12) 10 meters in sand, 40 meters in silts
- 13) SyQwest, Inc.'s TDU-850, TDU-1200/F and TDU-2000F Thermal Printers
- 14) It is designed for inshore and coastal geophysical marine survey up to 150 meters of water depth. (An optional depth rated transducer is available for ROV or manned submersible operation)
- 15) TR-109 Array from 9 to 16 @ 3.5kHz or 1 TC/12/34 or TC-12NB @ 12kHz
- 16) This system is designed for full ocean depth using 10KVA amplifier enables the system to sound to 11,000 meters
- 17) It is designed for applications in rivers, harbors, and coastal waters and performs to depths of 5,000 meters. An optional amplifier enables the system to sound to 11,000 meters

