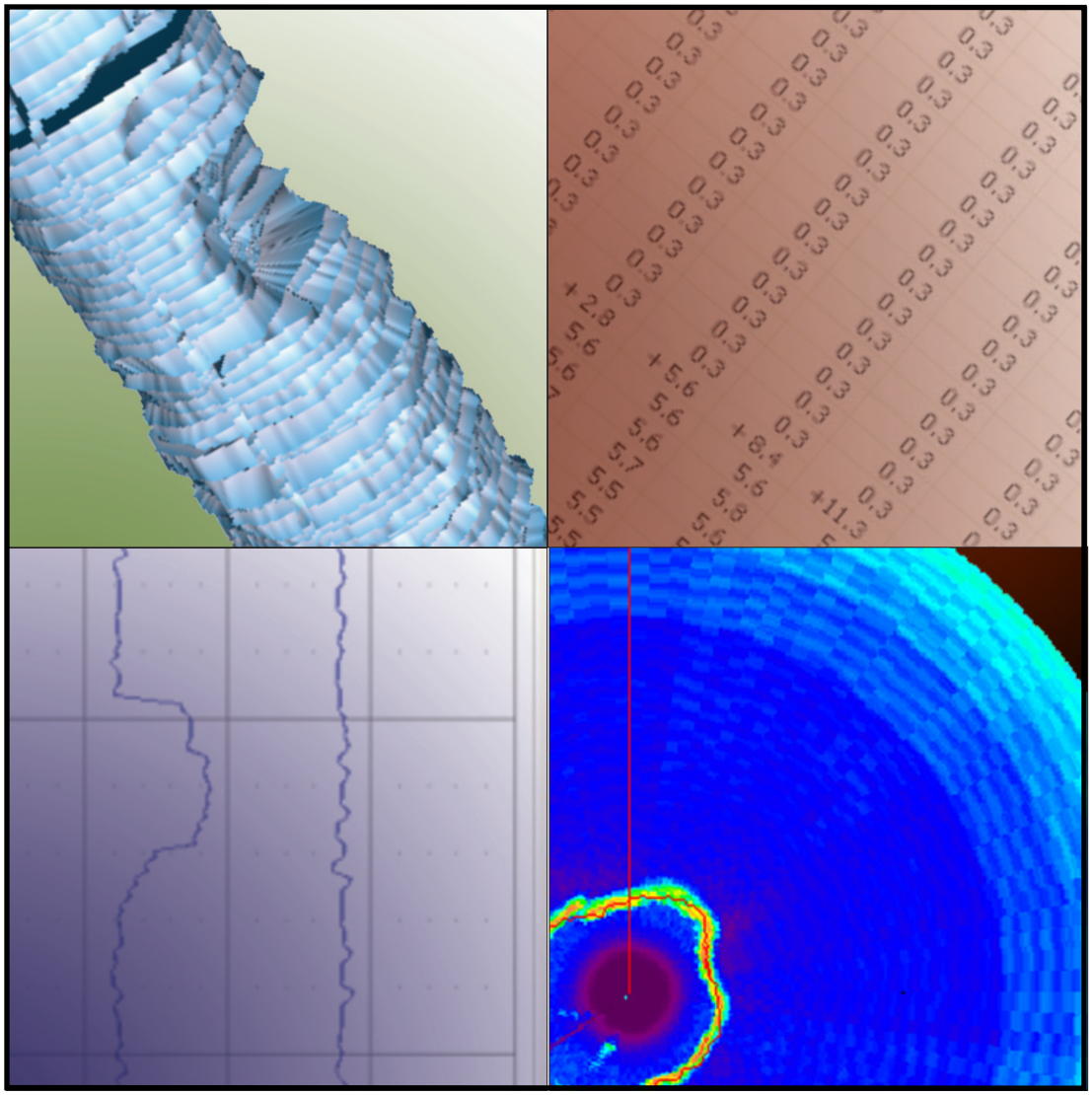
BOREHOLE SURVEYOR™

Borehole Survey Tool



SONASEARCH

BOREHOLE SURVEYOR™

The Borehole Surveyor™ is the latest in high-quality sonar tools for surveying fluid-filled boreholes. Designed by Sonasearch, this state-of-the-art device creates an accurate picture of the borehole shape and size, depicting borehole characteristics through horizontal and vertical cross sectional images as well as 3-D renderings and data tables. Reports include a complete borehole wall table that provides borehole radii deviation every 2.8 degrees, an abbreviated short borehole radii table and a maximum borehole radii table.

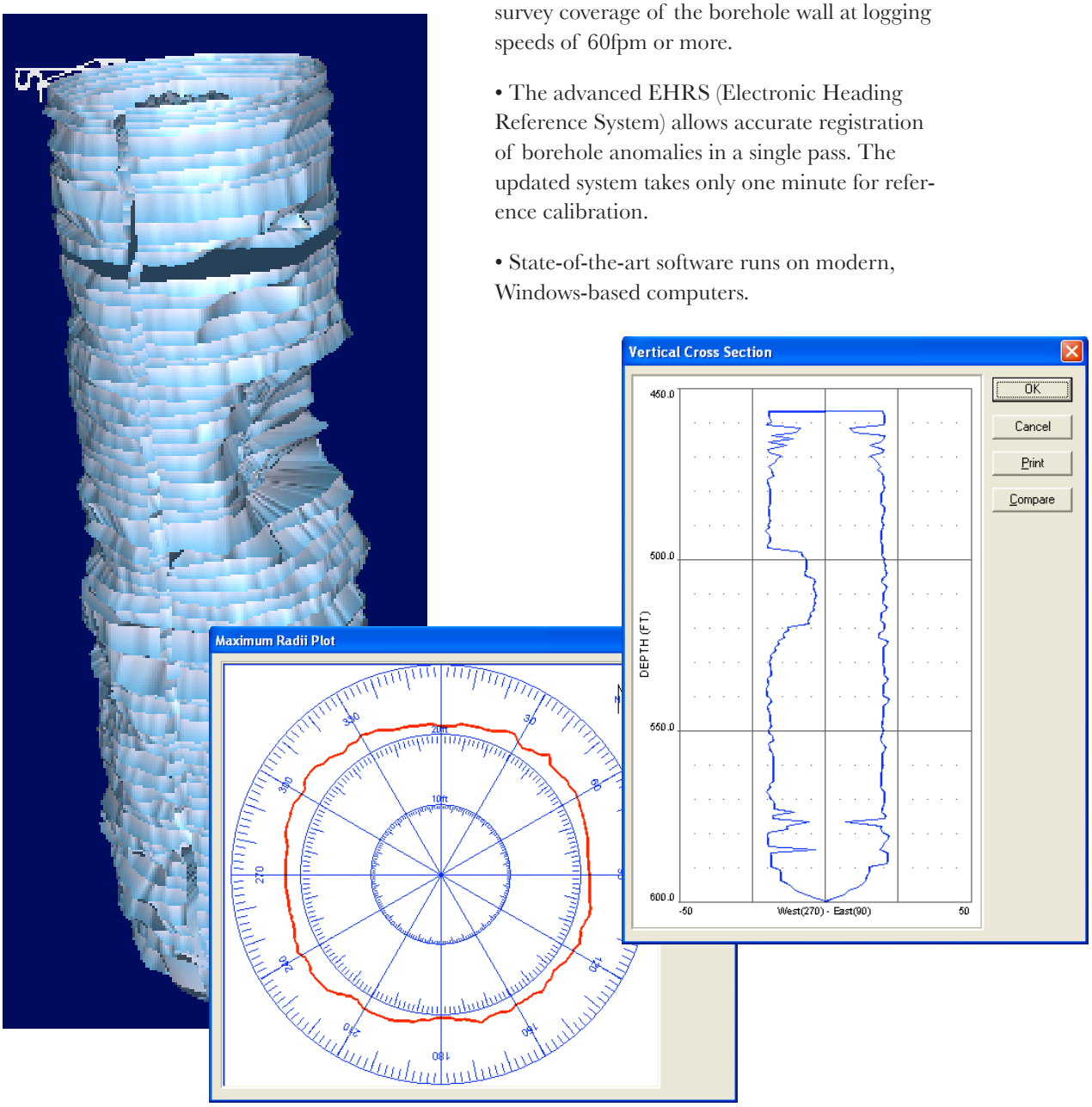
New advanced features only available in the Borehole Surveyor have been designed to solve some of the industry's most common problems and make this tool rise above similar technology. For example:

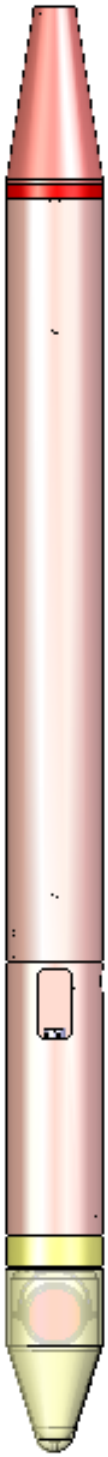
• The ability to accurately ensonify boreholes of 4" – 60" diameter through either water or oil-based drilling mud, providing accurate, timely, unambiguous data on which to base casing installation decisions.

• The ability to provide continuous, 360-degree survey coverage of the borehole wall at logging speeds of 60fpm or more.

• The advanced EHRS (Electronic Heading Reference System) allows accurate registration of borehole anomalies in a single pass. The updated system takes only one minute for reference calibration.

• State-of-the-art software runs on modern, Windows-based computers.





Background: Ideally, boreholes would be sufficiently pristine to allow uneventful casing installation. However, it is not uncommon for various circumstances to complicate or even prevent the casing from being installed without remedial action. Historically, this has resulted in significant delay, rework & expense to clear the blockage impeding casing installation. Without an accurate survey of borehole integrity, casing installation becomes a – potentially costly – gamble.

Our customer's story: A large drilling company was faced with just such a dilemma– trying to avoid the substantial lost profits, inefficiency and schedule delays associated with the rework of failed casing installation. Prior methods proved unable to accurately survey the integrity of borehole operations to provide the location, magnitude and orientation of borehole anomalies. Sonasearch was consulted for a solution, resulting in the Borehole Surveyor tool capable of quickly surveying the entire borehole, accurately ensonifying the borehole walls and determining borehole deviations. The resulting Borehole Surveyor tabular reports quantify the borehole anomalies graphically displayed in the 3-D images produced on-site. Given accurate, timely and unambiguous data, the drilling company is able to make an informed decision regarding whether remedial action is needed prior to casing installation, avoiding the costly rework associated with failed implementations.

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Software Display Capabilities	
Display Modes:	• PPI display of complete, 360 degree borehole wall data display allows for easy, quick and accurate detection of borehole anomalies. • Isometric view allows the operator to select rotation angle. • 3-D view aids borehole structure visualization
Range Selection:	2.5-10ft full-scale (76-300cm)
Cursor Control:	Moveable to any point on the display
Cursor Readout:	Range & bearing to cursor are displayed
Surface Command Capabilities	
Display Mode	
Magnetic Variation	
Heading Reference Selection	
Sampling Hold Off	
Range	
Recorded Depth	
Acoustic Transmitter Power	
Acoustic Receiver Gain	
Acoustic Receiver TVG Slope	
Surface Power Supply/Communications Interface	
Remotely located	
Interface to computer via RS-232	
Contains power supply & proprietary communications interface	
Physical Properties: 6” (15cm) W x 7” (18cm) D x 12” (30cm) H x 10 Lbs.(4.5Kg) Weight	
Electrical Input: 120/240 VAC @ .5 A	

Downhole (controlled via surface computer)	
Frequency:	250 kHz
Beam width:	4 degrees conical
North Orientation:	Via internal heading reference system
Media Velocity:	Measured/corrected via continuously running internal velocimeter
Construction:	C72900, Polypropylene
Physical Properties:	3.5" (8.9cm) dia. x 60.35" (153.3cm) Length x 115 Lbs.(52.1 Kg) Weight
Operating Temp.:	-45 to +200 degrees Fahrenheit
Operating Pressure:	0-5,000 psi
Input Power:	250 VAC–supplied by surface power supply
Service:	Field-replaceable printed circuit boards
Cable	
Rochester H-314A Steel Armored (or equivalent)	
Toolhead/Wireline connection via standard 1.1875’-12 thread	
Cable Length: 0-25,000 ft (0-7,620 m)	
Data Acquisition and Report Software	
The Borehole Surveyor is intended for use on Intel-based computers meeting or exceeding the following minimum requirements: 500mHz processor, 384mB memory, Windows XP or Windows 2000 Operating System, 5gB of available Hard Disk space, 800x600 screen resolution, Serial Port (not USB to Serial Conversion).	
Raw data storage limited only by hard disk drive size.	
The report format includes lead sheet, 1, 5 and 45 degree tables, volume table, maximum radii tables, cross sectional plots, maximum radii plot and 3-D plots.	

The **Borehole Surveyor** consists of a downhole probe, a Console Interface Electronics Cabinet, cavern survey and reporting software and custom shipping cases. The user must supply a PC with a serial port running Microsoft® Windows® XP operating system.

The Borehole Surveyor is primarily designed for sonar surveys of fluid-filled boreholes. A Sonar Engineer commands the Borehole Surveyor Probe electronics to sweep the walls of the borehole.

The sonar crystal transmits an ultrasonic frequency and the echo return is received, digitized and transmitted to the surface where it is displayed on a monitor. The transducer rotation speed and pulse rate are software controlled as a function of the selected range and speed of sound. The data displayed & stored includes date, depth, radii distance and angle of rotation in degrees.

For more information contact your Sonasearch representative:

or visit www.sonasearch.com
425-883-1984 (USA)

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