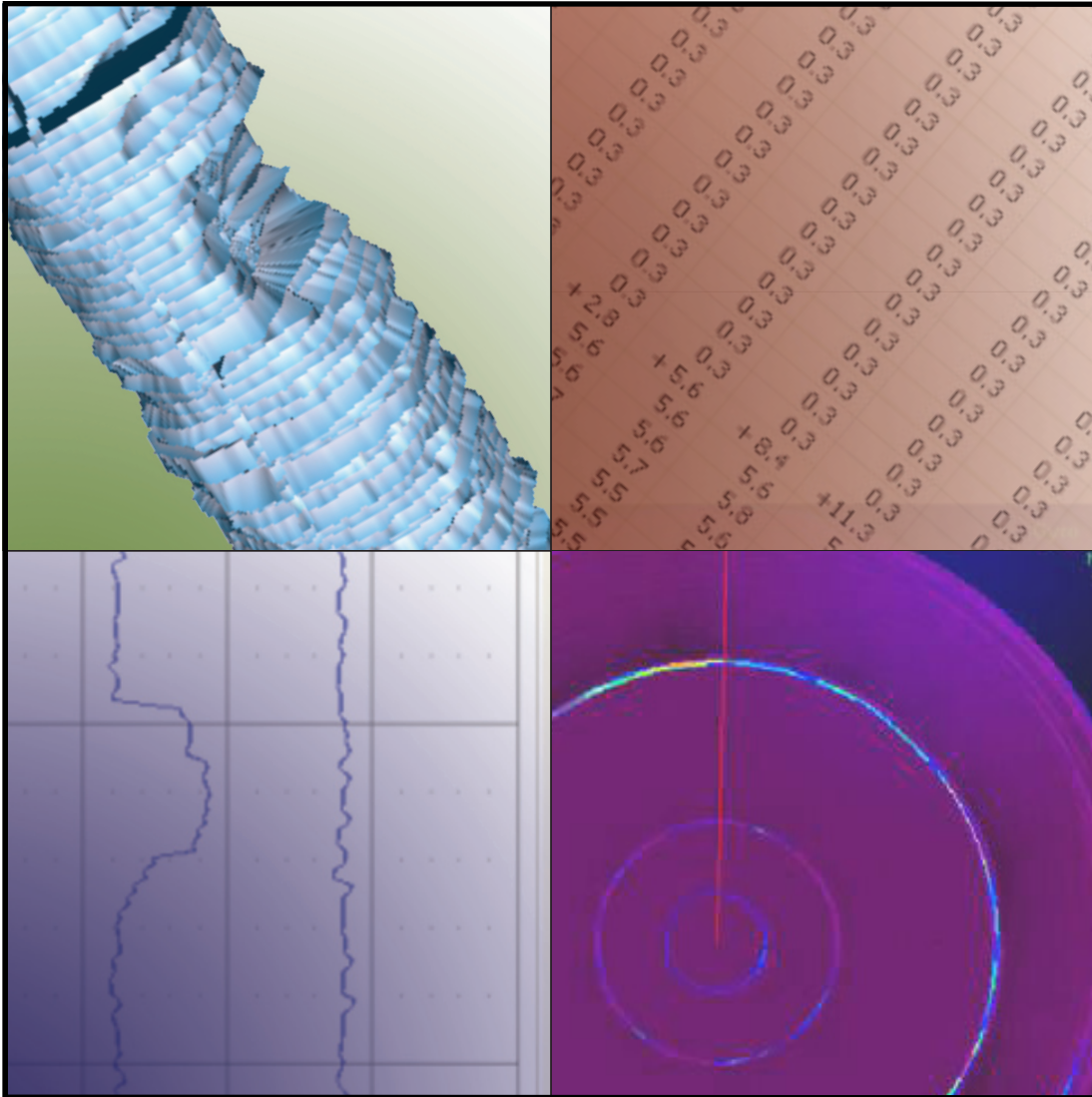


CASING SURVEYOR™ AIG



SONASEARCH



Background: Ideally, tubing/casings would be sufficiently pristine to allow unimpeded transfer of product. However, it is not uncommon for various circumstances to compromise the integrity of tubing/casing; affecting operability and/or production. Historically, this has resulted in significant delay, rework & expense to locate the compromised tubing/casing section(s) and repair them—particularly if the damage were to an outer tubing string or casing. Without the ability to accurately survey the tubing/casing in a single pass, the customer must resort to costly, time consuming rework.

Customer Story:

A large customer was faced with just such a dilemma—trying to avoid the substantial lost production, profits and schedule delays associated with the rework required to remove the tubing in order to survey the condition of the production tubing, remove the production tubing in order to survey the condition of the intermediate casing, etc. in an attempt to locate and repair compromised tubing.

Although current technology can eventually provide the information needed, the customer felt there had to be a faster, more cost-effective methodology, preferably one that avoided the coverage gaps inherent in multi-finger technology. Sonasearch was consulted for a solution, resulting in the Casing Surveyor tool capable of quickly surveying the entire tubing/casing, simultaneously surveying the tubing/production tubing/casing walls and determining tubing inside diameter, wall thickness and deformation and production tubing/casing inside diameter & deformations. The resulting Casing Surveyor tabular reports quantify the tubing/casing anomalies graphically displayed in the 3-D images produced on-site. Given accurate, timely and unambiguous data in a single survey, the customer is able to make an informed decision regarding whether remedial action is needed and where—avoiding the costly rework and multiple tubing/casing surveys associated with current technology.

Preliminary

Software Display Capabilities		Downhole (controlled via surface computer)	
Display Modes:	<ul style="list-style-type: none"> PPI, A-Mode. Raw data display allows for interpretation of first echo return, strongest echo return & average of echoes returned. 3-D view aids structure visualization. 	Frequencies:	1mHz/250 kHz
Cursor Control:	Moveable to any point on the display	North Orientation:	Via internal heading reference system
Cursor Readout:	Range & bearing to cursor are displayed	Construction:	Swissmetal C72900, Polypropylene
Surface Command Capabilities		Physical Properties:	2.75" (7.0 cm) dia. x Length (tbd) x Weight (tbd)
Display Mode		High Res. Logging Speed:	1800 feet/hour
Magnetic Variation		Low Res. Logging Speed:	4000 feet/hour
Heading Reference Selection		Inner Tubing Diameter:	3.5" (8.89 cm) – 7" (17.78 cm)
Recorded Depth		Outer Tubing Diameter:	5.5" (13.97 cm) – 13.375" (33.97 cm)
Acoustic Transmitter Power		Vertical Resolution (high res):	0.1" (0.25 cm)
Acoustic Receiver Gain		Radial Resolution:	2.81 degrees
Acoustic Receiver TVG Slope		Accuracy – Internal Radius:	+/- 0.03" (+/- 0.0762 cm)
Surface Power Supply/Communications Interface		Accuracy – Casing Thickness:	+/- 4%
Remotely located		Operating Temp.:	-30 to +125 C (later versions 175C)
Contains power supply & proprietary communications interface		Operating Pressure:	12,000 psi (later versions 20,000)
Physical Properties: 6" (15cm) W x 7" (18cm) D x 12" (30cm) H x 10 Lbs.(4.5Kg) Weight		Input Power:	250 VAC—supplied by surface power supply
Electrical Input: 120/240 VAC @ .5 A		Service:	Field-replaceable printed circuit boards
		Cable	
		Fiber Optic	
		Data Acquisition and Report Software	
		The Casing 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.	

The Casing 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 running Microsoft® Windows® XP operating system.

The Casing Surveyor is primarily designed for sonar surveys of fluid-filled (water or water/oil-based mud) tubing/casings. A Sonar Engineer commands the Casing Surveyor Probe electronics to sweep the tubing/casing walls.

The sonar transducer arrays transmit ultrasonic frequencies and the echo returns are

received, digitized and transmitted to the surface where they are displayed on the computer system monitor. 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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