Xaminer® Array Sonic Tool (XAST™) service

Cross-dipole array sonic tool

FEATURES

- Long-spaced monopole and broadband cross-dipole sources for sonic slowness measurement
- Broadband, eight-level quad-receiver array
- Acquisition of 128 waveforms per transmitter firing at surface
- 64 GB downhole memory for waveform storage
- Simultaneous monopole and cross-dipole measurements

BENEFITS

- Enables accurate slowness measurements across a wide range of formation properties
- Delivers high-quality waveform data for advanced processing
- Captures complete waveform sets for improved subsurface analysis
- Enhances operational flexibility through seamless tool integration
- Eliminates dispersion correction and depth shifting through clean source signal

Overview

The Xaminer® Array Sonic Tool (XAST™) service provides monopole and cross-dipole sonic measurements for formation evaluation. The tool determines fast and slow shear-wave travel times and orientation within the formation.

The service calculates minimum and maximum principal stresses and stress field orientation through integration of oriented slowness, overburden, and pore-pressure data. These measurements support geomechanical analysis, wellbore stability assessment, and production optimization design.

Sonic anisotropy and orientation identify the direction of natural fractures. Sonic attributes—including P-wave slowness, fast and slow shear-wave travel times, compressional fluid response, and anisotropy orientation—support three-dimensional seismic interpretation and reservoir characterization.

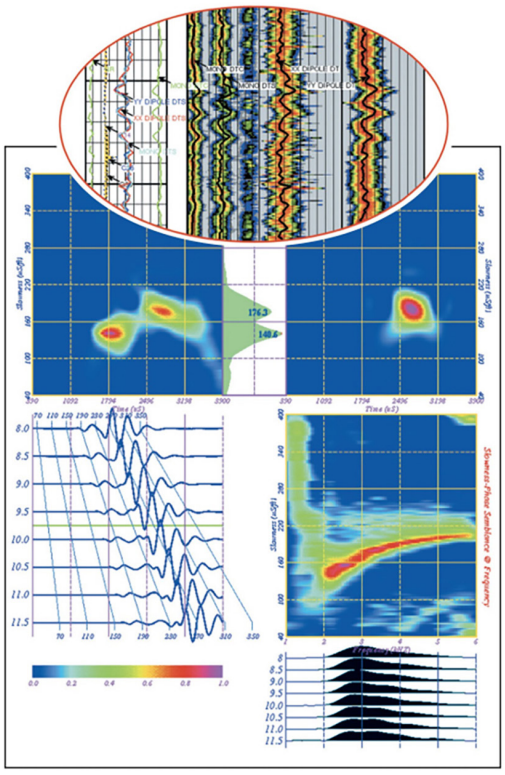


Figure 1

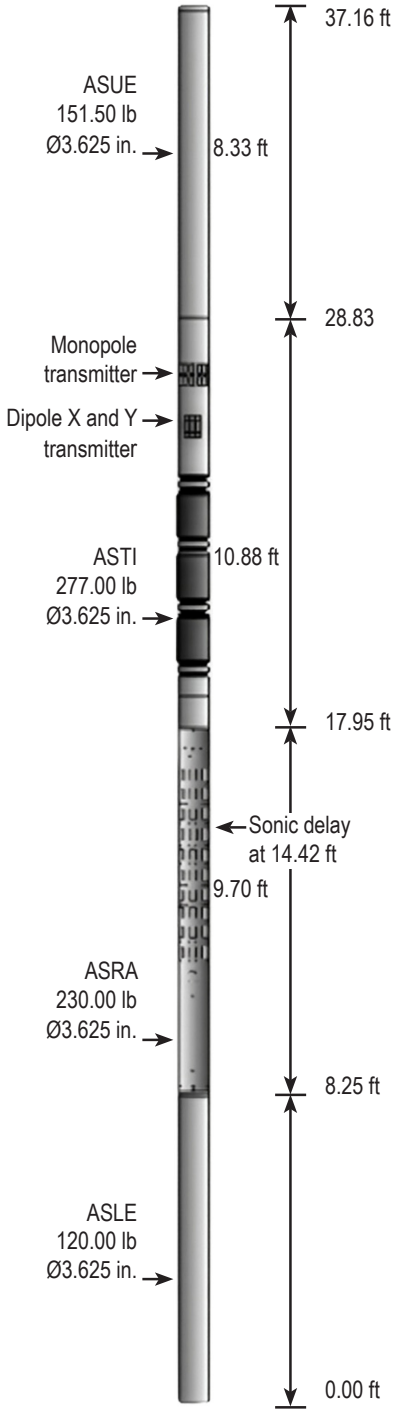
» **FIGURE 1 -** This is an example of a semblance diagnostic plot of the waveform data from the eight waveforms. In the circle is a section of a log showing monopole P-wave slowness and semblance quality, monopole-re- fracted shear-wave slowness and semblance quality, X-X dipole slowness and semblance quality, and Y-Y dipole slowness and semblance quality.

Reliable sonic data for complex reservoir

The XAST™ service delivers simultaneous monopole and cross-dipole sonic data across a wide range of formation types, from poorly consolidated, high-porosity gas sandstones to low-porosity carbonates.

Two low-frequency cross-dipole sources, collocated at the same depth, propagate flexural wave energy. The receiver array captures high-fidelity signals for consistent measurement accuracy.

The memory module captures raw, uncompressed waveforms downhole at high sampling rates and extended listening times. The data provides increased dynamic range and broader frequency bandwidth for advanced acoustic analysis in challenging environments.



XAST™ service specifications

ENVIRONMENTAL	STANDARD	DEEPSUITE™ LOGGING
Maximum temperature	350°F (177°C)	
Maximum pressure	20,000 psi (138 MPa)	35,000 psi (241 MPa)
Maximum hole	18.0 in. (406.4 mm)	
Minimum hole	5 in. (127 mm)	6 in. (152.4 mm)
Maximum tool OD	3.625 in. (92.1 mm)	4.4 in. (111.8 mm)
Makeup length	37.16 ft (11.33 m)	
Weight	778 lb (352.9 kg)	1317 lb (597.4 kg)
HARDWARE CHARACTERISTICS		
Number of receivers	32 (8 rings of 4 receivers)	
Receiver spacings	0.5 ft (0.15 m)	
T-R1 Distance	Monopole 10.75 ft (3.28 m); Dipole 9.75 ft (2.97 m)	
Sampling rate (SRO)	Monopole: 20 µs; Dipole: 40 µs; Stoneley: 60 µs	
Sampling rate (memory)	Monopole: 10 µs; Dipole: 20 µs; Stoneley: 20 µs	
Listening time	Monopole: 20 ms; Dipole: 50 ms; Stoneley: 15 ms	
Downhole Memory	64 Gigabytes	
MEASURMENT		
Slowness range	Δtp 40 to 300 µs/ft, Δts 60 to 900 µs/ft, ΔtSt 185 to 1000 µs/ft	
Vertical resolution	Standard: 3.5 ft (1.07 m); High: 0.5 ft (0.15 m)	
Depth of investigation	1 to 3 ft (0.3 to 9.8 m)	
Maximum logging speed	1 spf: 60 ft/min (18 m/min); 2 spf: 30 ft/min (9 m/min); 4 spf: 15 ft/min (5 m/min)	

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